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North Carolina

Department of Conservation and Development

William P. Saunders, *Director*

Division of Mineral Resources

Jasper L. Stuckey, *State Geologist*

Bulletin Number 72

JUN 28 1961

WELL LOGS FROM THE COASTAL PLAIN OF NORTH CAROLINA

By

Philip Monroe Brown

Geologist, U. S. Geological Survey

Prepared Cooperatively by the Geological Survey

United States Department of the Interior

DEPARTMENT OF THE
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1958

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Sample Classification Based on Materials From North Carolina Water Wells

Sample		Slot size
Very fine sand		2-4
Fine sand		4-10
Medium sand		10-20
Coarse sand		20-40
Fine gravel		40-80
Medium gravel	Shot size to pea size	80-187.5
Coarse gravel	Pea size and up	187.5

Limestone and dolomitic limestone		Hard to soft, depending on degree of cementation
Marl		Generally blue-gray in North Carolina well samples
Glauconitic sand		Light to dark green color
Phosphatic sand		Light brown to black color

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LETTER OF TRANSMITTAL

Raleigh, North Carolina
June 10, 1958

To His Excellency,
HONORABLE LUTHER H. HODGES
Governor of North Carolina

Sir:

This is another in the series of reports on ground water in North Carolina being prepared cooperatively by the Department of Conservation and Development and the United States Geological Survey. It contains valuable information in the subsurface geology and ground-water resources of the coastal plain. This report should be of real value to municipalities, industries and individuals interested in the coastal plain of North Carolina.

Respectfully submitted,

WILLIAM P. SAUNDERS

Director

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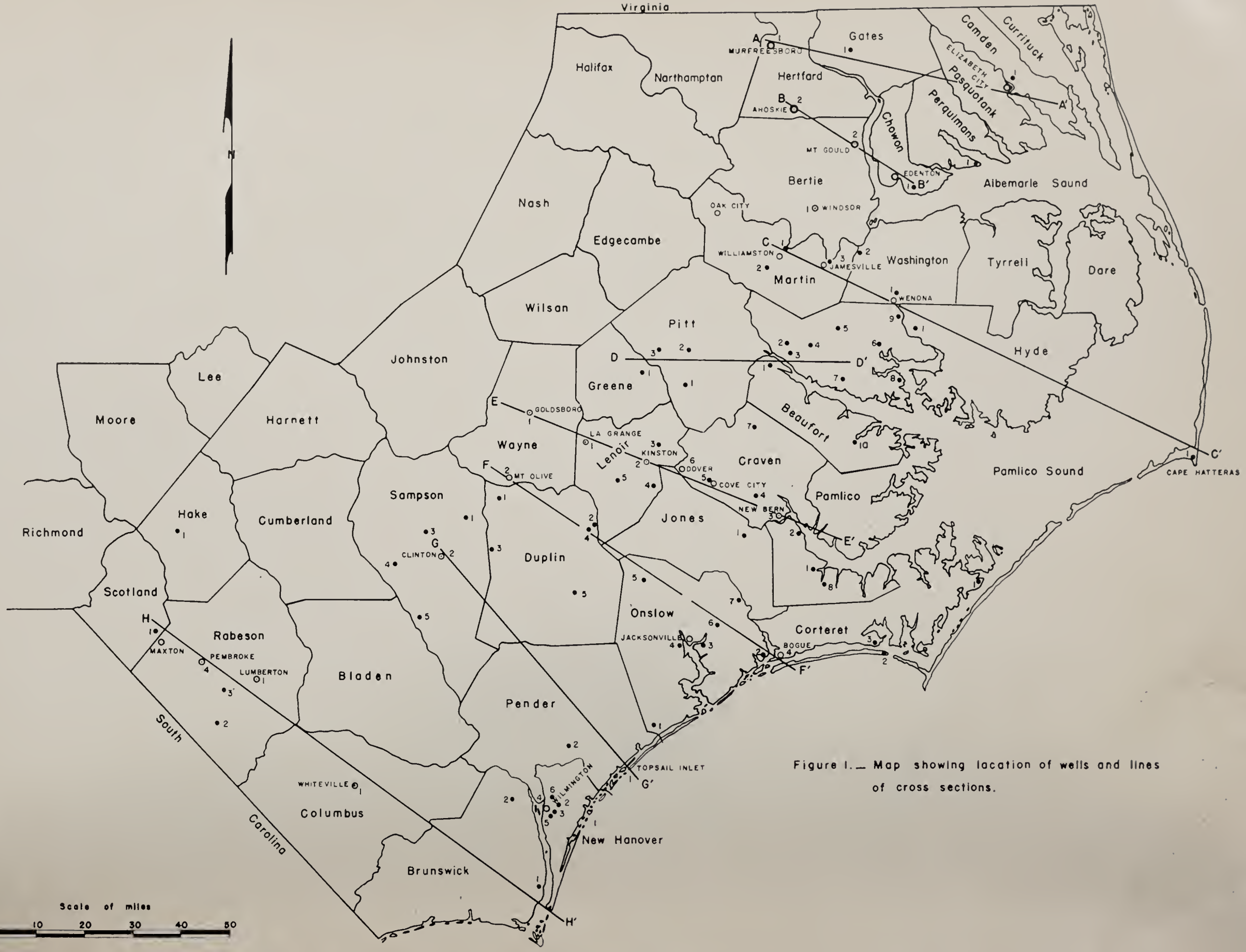

Figure 1.— Map showing location of wells and lines of cross sections.

WELL LOGS FROM THE COASTAL PLAIN OF NORTH CAROLINA

By

PHILIP MONROE BROWN

INTRODUCTION

This report contains the logs of 82 wells from the Coastal Plain of North Carolina. The logs classify the rock material by percentages of major constituents, and record some of the diagnostic Ostracoda from the formations penetrated in drilling.

The report was prepared as a part of the ground-water investigations in North Carolina being made by the Geological Survey in cooperation with the Division of Mineral Resources, North Carolina Department of Conservation and Development.

A prerequisite to any study concerned with the occurrence and availability of ground-water supplies is a knowledge of subsurface geologic conditions, particularly as to the characteristics of the individual geologic formations that affect their hydrologic properties. These characteristics include the lithology and geographic extent of the formations.

A primary purpose of the present study is to correlate subsurface information so that the lithologic composition and geographic extent of water-bearing formations can be determined in areas where current ground-water studies are being made. This information will be helpful also in planning future ground-water studies in areas where little information concerning ground water is now available.

Another primary purpose is to make available to the well driller and prospective well owner information that has been gathered about the depth and lithologic properties of the various water-bearing beds. Little is known of the performance of many individual wells. However, if such facts as yield, static water level, and quality of water are known, these facts are included with the descriptions of individual wells. A sample-classification card has been included to assist the reader in visualizing the material described from individual wells.

A secondary purpose is to present recent information dealing with the stratigraphy of the Coastal Plain of North Carolina in order to bring up to date the stratigraphic concepts as they apply to Coastal Plain geology. Many stratigraphic problems still exist. It is hoped that this study will help to stimulate the interest necessary to solve such problems.

Supervision and Acknowledgments

This investigation was made under the general supervision of A. N. Sayre, Chief, Ground Water Branch, U. S. Geological Survey, and under the direct supervision of H. E. LeGrand, formerly district geologist in charge of ground-water investigations in North Carolina.

The necessity of saving well cuttings as an aid in the interpretation of subsurface geology and hydrology cannot be too strongly emphasized. The willing cooperation of many drillers and municipal officials in furnishing samples and driller's logs from completed wells makes possible this report. Dr. J. L. Stuckey, State Geologist, made available for examination the electric logs and well cuttings from oil test wells in the State.

Dr. Landis Bennett, Visual Aids Department, North Carolina State College, kindly acted as technical advisor with regard to photographic problems.

SAMPLES

Cuttings from many wells were examined in this study. The wells logged are those selected as being the most representative in their area of occurrence. All drilling methods were represented, and, where possible, consideration was given to the possible effects of the drilling method and to the quality and dependability of the samples. Consideration was given also to previously inferred geologic conditions.

All samples were examined under the binocular microscope. Unconsolidated materials were then boiled in a weak solution of sodium carbonate, washed and dried, and the microfossils were floated off with carbon tetrachloride. Samples failing to yield an abundant floated concentrate, sufficient for identification of the formational unit, were "picked" for their contained microfauna. Indurated samples were crushed and then leached with a sodium carbonate solution to obtain an identifiable microfauna.

The Ostracoda have supplied the chief paleontologic control in this study. It is hardly necessary to mention the economic value of the Ostracoda other than to say that their abundance and wide distribution in well cuttings have made them ideal as stratigraphic markers. No attempt was made in this report to identify or tabulate all the ostracode specimens obtained from the well cuttings. Only those species of limited vertical range and relatively wide geographic distribution are included.

Several species of ostracodes are listed in the text by letter, such as *Trachyleberis* sp. *A.*, sp. *B.*, etc. Such a listing indicates that the species are restricted to certain formations or zones in outcrop in North Carolina; although not formally described or illustrated at present, they are considered by the writer to have stratigraphic value as subsurface markers.

All microfaunal identifications are the writer's own except as indicated in "Remarks" after the individual well descriptions.

Individual specimens have been compared with specimens from outcropping formations in North Carolina, with specimens from type material from other States, or with specimens on deposit at the U. S. National Museum. The excellent work on North Carolina Ostracoda previously published by Dr. F. M. Swain of the University of Minnesota (1951, 1952) has served as a guide and a reference during the present study.

Figured specimens are deposited at the U. S. National Museum, Washington, D. C. Specimen numbers in the text are National Museum numbers.

CORRELATION

On the chart (table 1) the formations of the Coastal Plain of North Carolina are listed, together with a brief summary of their lithology, origin, distribution, and hydrologic properties. The reader who is interested in more detailed discussions of the formations is referred to reports published by the North Carolina Division of Mineral Resources.

Cretaceous, Paleocene, and Eocene strata of the Coastal Plain of North Carolina are correlated with time equivalents of the Gulf Coastal province, generally considered to represent the standard section. The Miocene formations, similar faunally and lithologically to Miocene formations in Virginia, are correlated with the time equivalents of the Atlantic Coastal Plain as recognized in Virginia.

Strata of Paleocene and early Eocene age, not known to occur in surface exposures, can be differentiated both faunally and lithologically in the subsurface. These units, not formally described in this report, will be treated in detail in ground-water reports dealing with their immediate area of occurrence.

The Castle Hayne limestone of Eocene age has been considered as both Jackson and Claiborne in age by various writers.[1] The present writer believes that the principle of temporal transgression should be applied to this formation. There is no lithologic disharmony either in wells or outcrop between those sections that contain a dominant Jackson fauna and those sections that contain a dominant Claiborne fauna. In addition, transitional biofacies containing both Jackson and Claiborne elements, neither of which is dominant, are recognizable. The apparent differences in lithofacies in some outcropping sections are considered by the writer to be postdepositional and in large part to have resulted from the physical and chemical action of circulating ground water. Such lithofacies cross time lines and are not diagnostic for the purpose of mapping and correlating either surface or subsurface sections. Therefore, in the interest of practical application to both surface and subsurface problems of correlation, it is the writer's opinion that the Castle Hayne limestone was deposited during a temporal transgression from Claiborne time into Jackson time, the bulk of deposition having occurred during Jackson time.

Material of post-Miocene age listed by the writer in the well logs includes the terrace formations as defined by Stephenson.[2] Neither faunal nor lithologic evidence can be found for differentiating the terrace formations in the subsurface.

Cross sections showing the structure of the Coastal Plain as inferred from the well cuttings are given in figures 2-9. The locations of the cross sections and the wells used in their construction are shown on figure 1. The wells are too few to make possible the construction of dip sections exactly normal to the generally northeast strike of the Coastal Plain formations. Lines of section are arbitrarily drawn so as to include the greatest number of key wells. Wells that would not normally fall on the lines of section are projected in a direction parallel to the regional strike until they intersect the nearest line of section.

It is hoped that, as additional well cuttings become available for study, the material in this bulletin will serve as a base from which to build a more complete and accurate knowledge of the stratigraphy of the North Carolina Coastal Plain than now exists.

Of necessity, certain arbitrary standards were established in order to reduce the number of lithologic terms used. For example, sands containing glauconite are described as "sand" if the amount of glauconite is less than 25 percent. If the amount of glauconite is 25 percent or more, the material is called a "glauconitic sand." The same system is used throughout. A sand containing clay does not become "sand and clay" until the clay fraction has reached 25 percent.

The well logs on the following pages are arranged alphabetically by counties, the well logs being numbered consecutively in individual counties. Complete and continuous sets of samples are rare. No attempt was made to define the lithology of missing intervals, and they are shown as blanks on the geologic cross sections. When a sample was missing at a formational contact, the missing interval was assigned on the basis of information from nearby wells.

Some logs show that a chemical analysis of the water is available for that particular well. Such a notation signifies that the U. S. Geological Survey has made an analysis of the water, and that the analysis is available in the open file material at the office of the Ground Water Branch, U. S. Geological Survey, Room 448, Post Office Building, Raleigh, North Carolina.

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[1] Miller, B. L., 1912, North Carolina Geol. and Econ. Survey, v. 3, p. 185.
Cooke, C. W., 1916, The age of the Ocala limestone: U. S. Geol. Survey Prof. Paper 95, p. 111.
Canu, F., and Bassler, R. S., 1920, North American early Tertiary Bryozoa: U. S. Nat. Mus. Bull. 106.
Kellum, L B., 1926, Paleontology and stratigraphy of the Castle Hayne and Trent marls in North Carolina: U. S. Geol. Survey Prof. Paper 143, p. 8 and 14.
Richards, H. G., 1950, Geology of the Coastal Plain of North Carolina: Am. Philos. Soc., Trans. new ser., v. 40, pt. 1, p 15.
Cooke, C. W., and MacNeil, F S., 1952, Tertiary stratigraphy of South Carolina: U. S. Geol. Survey Prof. Paper 243-B, p. 25.

[2] Stephenson, L. W., 1912, The Quaternary formations: North Carolina Geol. and Econ. Survey, v. 3, p. 272.

WELL LOGS FROM THE COASTAL PLAIN OF NORTH CAROLINA

Beaufort County

Number 1

Location: At Nelson Motel, 0.7 mile south of Chocowinity on U.S. Route 17.
Owner: Nelson Motel
Date drilled: 1952
Driller: I. T. Jannette
Elevation of well: 44 feet above sea level

Hydrologic Information

Diameter of well: 4 inches
Depth of well: 215 feet
Cased to: 210 feet
Finish: 5-foot screen from 205 to 210 feet
Static (nonpumping) water level: Unknown
Yield: Unknown
Temperature: 62°F
Chemical analysis of water available

Log of Well

Depth (feet)	
	Post-Miocene—surficial sands
18-25	Sand, tan; 90 percent fine-grained angular quartz sand. 10 percent tan clay matrix, unconsolidated. Limonitic staining of quartz grains predominant.
25-40	Sand, tan; Same as 18-25-foot interval.
40-70	Sand, tan: Same as 18-25-foot interval.
	Middle Eocene—lower part of Castle Hayne limestone
75-80	Sandy, dolomitic limestone, gray; 35 percent medium to fine-grained subangular quartz sand. 65 percent partially recrystallized shell fragments in a calcareous matrix, well consolidated and hard. Ostracoda and Foraminifera rare.
90-100	Calcareous sand, white; 40 percent fine-grained subangular quartz sand. 35 percent abraded limestone fragments. 25 percent calcareous silt and clay matrix, loosely consolidated and chalky. Ostracoda and Foraminifera common.
100-120	Calcareous sand, white; Same as 90-100-foot interval. Ostracoda and Foraminifera common.
120-140	Calcareous sand, light-green; 50 percent medium to fine-grained subrounded to subangular quartz sand. 35 percent broken calcareous fragments. 5 percent dark-green medium-grained glauconite. 10 percent green calcareous clay matrix, unconsolidated. Ostracoda and Foraminifera common.
140-150	Calcareous sand, light-green; Same as 120-140-foot interval. Ostracoda and Foraminifera common.
	Ostracoda from 75-150-feet include: *Brachycythere* cf. *B. jessupensis* Howe and Garrett *Trachyleberis bassleri* (Ulrich) *Trachyleberis pellucinoda* (Swain) *Actinocythereis stenzeli* (Stephenson) *Actinocythereis hilgardi* (Howe and Garrett)
	Palcocene—unnamed unit
150-170	Glauconitic sand, "salt and pepper"; 40 percent fine-grained subangular quartz sand. 30 percent dark to light-green medium-grained glauconite. 30 percent calcareous fragments and calcareous clay matrix, loosely consolidated with indurated streaks. No Ostracoda, Foraminifera very rare.
170-190	Glauconitic sand, "salt and pepper"; Same as 150-170-foot interval. Ostracoda very rare, Foraminifera common.
190-210	Sand, gray; 80 percent fine to medium-grained subangular quartz sand. 20 percent gray clay matrix, unconsolidated. Trace of light-green fine-grained glauconite. Ostracoda and Foraminifera abundant.
210-215	Glauconitic sand; light-green; 60 percent medium-grained subrounded water-polished quartz sand. 25 percent dark-green medium-grained glauconite. 15 percent green to gray clay matrix, unconsolidated. Trace of broken shell fragments. Ostracoda and Foraminifera rare.
	Ostracoda occurring in samples from 170-215-feet include: *Cytheridea (Haplocytheridea) ruginosa* Alexander *Brachycythere interrasilis* Alexander *Trachyleberis midwayensis* (Alexander) *Trachyleberis prestwichiana* (Jones and Sherborn) *Trachyleberis spiniferrima* (Jones and Sherborn) *Orthonotacythere cristata* Alexander

Remarks: No Ostracoda were obtained from the 150-170-foot sample. The top of the Paleocene is placed at 150 feet on the basis of lithology. The first Paleocene Ostracoda occur in the 170-190-foot sample.

Beaufort County

Number 2

Location: Stratigraphic test hole 0.6 mile west of bridge crossing Cherry Run on U. S. Route 17, 2.4 miles northeast of Washington, North Carolina.
Owner: American Metals Co.
Date drilled: 1952
Driller: Heater Well Co.
Elevation of well: 30 feet above sea level.

Hydrologic Information

Diameter of test hole: 4 inches
Static (nonpumping) water level: 16 feet below land surface (reported 1952)
Depth of test hole: 310 feet
Sampled to: 235 feet

Log of Test Hole

Depth (feet)	
	Post-Miocene—surficial sands
10-20	Sand and clay, tan; 60 percent fine to medium-grained angular to subangular quartz sand. 40 percent tan clay matrix, unconsolidated. No microfossils.
20-30	Sand, tan; 80 percent coarse to medium-grained subrounded quartz sand. 20 percent tan clay matrix, unconsolidated. Limonitic standing of quartz grains predominate. No microfossils.
30-40	Sand, tan; Same as 20-30-foot interval. No microfossils.
	Upper Miocene—Yorktown formation
40-50	Marl, gray; 40 percent medium-grained subrounded quartz sand. 30 percent blue-gray clay matrix, unconsolidated. 30 percent broken shell fragments. Ostracoda and Foraminifera very rare.
59-70	Clay, dark-gray; 20 percent very fine-grained angular quartz sand. 80 percent gray clay matrix, unconsolidated. Ostracoda and Foraminifera rare.
70-80	Marl, light-gray; 40 percent medium-grained subrounded quartz sand. 35 percent gray clay matrix, unconsolidated. 25 percent broken abraded shell fragments. Ostracoda rare and Foraminifera common.
	Ostracoda from 40-70-feet include: *Puriana rugipunctata* (Ulrich and Bassler) *Actinocythereis exanthemata* (Ulrich and Bassler) *Murrayina martini* (Ulrich and Bassler) *Hemicythere conradi* Howe and McGuirt
	Middle Eocene—lower part of Castle Hayne limestone
80-90	Sandy limestone, white; 35 percent medium-grained subangular water-polished quartz sand. 65 percent white shell and limestone fragments in a calcareous clay matrix, loosely consolidated to hard in streaks. Trace of glauconite and phosphate. Ostracoda and Foraminifera abundant.
90-100	Sandy limestone, white; Same as 80-90-foot interval. Ostracoda and Foraminifera abundant.
100-110	Sandy limestone, white; Same as 80-90-foot interval with glauconite increasing to $\pm$5 percent. Ostracoda and Foraminifera abundant.
110-120	Sandy limestone. white; Same as 80-90-foot interval. Ostracoda and Foraminifera abundant.
120-130	Sandy limestone, white; Same as 80-90-foot interval. Ostracoda and Foraminifera abundant.
130-140	Sandy limestone, white; Same as 80-90-foot interval but indurated and very hard. Ostracoda and Foraminifera common.
140-145	Sand and clay, green; 60 percent fine-grained angular quartz sand. 30 percent green clay matrix, unconsolidated. 10 percent

light-green fine-grained glauconite. Ostracoda rare, Foraminifera common.

Ostracoda from 80-140-feet include:
Cytheridea (Haplocytheridea) montgomeryensis Howe and Chambers
Cytheridea (Clithrocytheridea) virginica (Schmidt)
Cytherura sp. aff. *C. washburni* Stephenson
Trachyleberis pellucinoda (Swain)
Trachyleberis rukasi (Gooch)
Trachyleberis bassleri (Ulrich)
Pterygocythereis washingtonensis Swain
Buntonia howei (Stephenson)

Paleocene—unnamed unit

145-150 Glauconitic sand, "salt and pepper"; 40 percent coarse to medium-grained subrounded quartz sand. 30 percent dark-green medium-grained glauconite. 15 percent green clay matrix, unconsolidated. 15 percent large broken shell fragments, primarily brachiopods. *Nodosaria* sp. prominent in hand specimen. No Ostracoda, Foraminifera common.

155-165 Sand, gray; 70 percent coarse to medium-grained subangular to subrounded quartz sand. 20 percent gray clay and silt matrix, unconsolidated. 10 percent dark-green medium-grained glauconite. Ostracoda and Foraminifera rare.

165-175 Sand, gray; Same as 155-165-foot interval with trace of coarse broken shell fragments. Ostracoda and Foraminifera common.

Ostracoda from 155-165-foot include:
Cytheridea (Haplocytheridea) ruginosa Alexander
Brachycythere interrasilis Alexander
Trachyleberis spiniferrima (Jones and Sherborn)
Trachyleberis cf. T. prestwichiana (Jones and Sherborn)
Trachyleberis midwayensis (Alexander)
Trachyleberis bassleri (Ulrich)
No Ostracoda were obtained from samples between 140 and 155 feet. The top of the Paleocene is placed at 145 feet on the basis of lithology. The first Paleocene Ostracoda occur in the 155-foot sample.

Upper Cretaceous—Peedee formation

175-185 Sand, gray; 70 percent fine to medium-grained subangular quartz sand. 30 percent gray silt and clay matrix, unconsolidated. Light-green fine-grained glauconite prominent. Ostracoda and Foraminifera very abundant.

185-195 Sand, gray; Same as 175-185-foot interval. Ostracoda and Foraminifera abundant.

195-200 Sand, gray; Same as 175-185-foot interval. Ostracoda and Foraminifera abundant.

200-205 Sand, gray; 80 percent coarse to medium-grained subrounded to rounded quartz sand. 20 percent gray clay matrix, unconsolidated. Trace of dark-green glauconite.

205-210 Sand, gray; Same as 200-205-foot interval with addition of 5 percent authigenic euhedral feldspar crystals which generally show twinning and which are partially kaolinized. Ostracoda and Foraminifera common.

210-221 Sand, gray; Same as 200-205-foot interval. Ostracoda and Foraminifera common.

221-225 Glauconitic sand; "salt and pepper"; 55 percent coarse to medium-grained subrounded to subangular quartz sand. 30 percent dark-green medium-grained glauconite. 15 percent gray silt and clay matrix, unconsolidated. Ostracoda and Foraminifera rare.

230-235 Glauconitic sand, green; 20 percent medium-grained subangular quartz sand. 60 percent dark-green medium-grained glauconite. 20 percent gray-green silt and clay matrix, unconsolidated. Ostracoda rare, Foraminifera common.

Ostracoda from 175-235-feet include:
Cytheridea (Haplocytheridea) ulrichi (Berry)
Eucytherura curta (Jennings)
Brachycythere rhomboidalis (Berry)
Trachyleberis pidgeoni (Berry)
Trachyleberis communis (Israelsky)
Velarocythere arachoides (Berry)

Beaufort County

Number 3

Location: 300 yards north of bridge crossing Herring Run on U. S. Route 264.
Owner: Mrs. Ethel Rhodes
Driller: I. T. Jannette
Date drilled: 1952
Elevation of well: 24 feet above sea level

Hydrologic Information

Diameter of well: 4 inches
Depth of well: 180 feet
Cased to: 180 feet
Finish: open end
Static (nonpumping) water level: 19 feet, reported (1952)
Yield: Unknown
Temperature: 61°F
Chemical analysis of water available

Log of Well

Depth (feet)

Post-Miocene—surficial sands

0-60 Sand, tan; 80 percent fine-grained angular quartz sand. 20 percent silt and clay matrix, unconsolidated. Limonite staining of quartz sand prominent. Trace of very fine-grained ilmenite.

Middle Eocene—lower part of Castle Hayne limestone

60-75 Dolomitic limestone, white; 20 percent fine-grained angular quartz sand. 80 percent dolomitic limestone showing partial recrystallization, well consolidated and hard. Ostracoda and Foraminifera rare.

75-85 Dolomitic limestone, white; Same as 60-75-foot interval.

85-90 Dolomitic limestone, white; Same as 60-75-foot interval.

90-105 Sandy, dolomitic limestone, white; 45 percent fine to medium-grained angular to subangular quartz sand. 55 percent dolomitic limestone, hard and well consolidated.

105-112 Sandy, dolomitic limestone, white; Same as 90-105-foot interval.

112-132 Calcareous sand, gray; 60 percent fine to medium-grained subangular to subrounded quartz sand. 40 percent limestone fragments in a gray calcareous matrix, moderately indurated.

132-150 Calcareous sand, gray; Same as 112-132-foot interval.

150-170 Shell limestone, white; 20 percent fine-grained subangular quartz sand. 80 percent broken shell fragments in a white calcareous clay matrix, indurated and hard.

Ostracoda from 60-170-feet include:
Cytheridea (Clithrocytheridea) virginica (Schmidt)
Brachycythere martini Murray and Hussey
Trachyleberis pellucinoda (Swain)
Trachyleberis rukasi (Gooch)
Trachyleberis bassleri (Ulrich)
Cytheromorpha cf. *C. eocenica* Stephenson
Cytheretta alexanderi Howe and Chambers

Beaufort County

Number 4

Location: Singleton farm, 4.2 miles north of U.S. Route 264 on an unnumbered, hard surfaced road bordering Great Swamp and connecting U.S. Route 264 and N.C. Route 32.
Owner: John Singleton
Date drilled: 1952
Driller: I. T. Jannette
Elevation of well: 39 feet above sea level

Hydrologic Information

Diameter of well: 2 inches
Static water level: 20 feet below land surface (1952)
Depth of well: 340 feet
Cased to: 300 feet
Finish: open end
Yield: Unknown
Temperature: 61°F
Chemical analysis of water available

Log of Well

Depth (feet)

Post-Miocene—surficial sands

55-75 Sand, white; 90 percent medium-grained subangular quartz sand. 10 percent white clay matrix, unconsolidated

75-80 Sand, white; Same as 55-75-foot interval.

Middle Eocene—lower part of Castle Hayne limestone

80-110 Marl, gray; 35 percent medium-grained subrounded to subangular quartz sand. 50 percent broken abraded shell fragments. 15 percent calcareous silt and clay matrix, loosely consolidated. Trace of dark-green medium-grained glauconite and black fine-grained phosphate. No Ostracoda, Foraminifera very rare.

110-127 Marl, gray to white; Same as 80-110-foot interval. No Ostracoda, Foraminifera very rare.

127-147 Marl, gray to white; Same as 80-110-foot interval. Ostracoda abundant, Foraminifera rare.

147-168 Calcareous sand, cream to white; 65 percent fine to medium-grained angular to subangular water-polished quartz sand. 35 percent fine calcareous fragments in a calcareous clay matrix, loosely consolidated. Ostracoda abundant, Foraminifera very rare.

168-180 Calcareous sand, cream to white; Same as 147-168-foot interval. Ostracoda rare, Foraminifera common.

180-200 Calcareous sand, cream to white; Same as 147-168-foot interval with addition of 5 percent dark-green medium-grained glauconite and a 5 percent decrease in percentage of quartz. Ostracoda rare and Foraminifera common.

210-220 Shell limestone, cream; 10 percent fine-grained angular to subangular quartz sand. 90 percent broken shell fragments in a calcareous matrix, indurated and hard. Ostracoda very rare, very small Foraminifera abundant.

220-230 Shell limestone, cream; Same as 210-220-foot interval with 10 percent increase in quartz sand. Ostracoda and Foraminifera rare.

Ostracoda occurring in the 80-230-foot interval include:
Cytheridea (Haplocytheridea) montgomeryensis Howe and Chambers
Cytheridea (Clithrocytheridea) virginica (Schmidt)
Trachyleberis bassleri (Ulrich)
Trachyleberis rukasi (Gooch)
Trachyleberis pellucinoda (Swain)
Pterygocythereis washingtonensis Swain
Actinocythereis hilgardi (Howe and Garrett)
Loxoconcha creolensis Howe and Chambers
Cytherctta alexanderi Howe and Chambers

Paleocene—unnamed unit

250-270 Glauconitic sand, apple-green; 40 percent medium-grained subrounded quartz sand. 35 percent apple-green medium to fine-grained glauconite. 25 percent calcareous silt and clay matrix, loosely consolidated. Ostracoda and Foraminifera rare.

270-290 Glauconitic sand, apple-green; Same as 250-270-foot interval with slight increase in percentage of glauconite. Ostracoda and Foraminifera rare.

290-318 Glauconitic sand, "salt and pepper"; 70 percent fine to medium grained angular to subangular quartz sand. 25 percent dark-green fine-grained glauconite. 5 percent calcareous clay matrix, unconsolidated. No Ostracoda, Foraminifera rare.

318-330 Glauconitic sand, "salt and pepper"; Same as 290-318-foot interval. Ostracoda rare, Foraminifera common.

Ostracoda occurring in the 250-318-foot interval include:
Brachycythere interrasilis Alexander
Trachyleberis sp. aff. T. prestwichiana (Jones and Sherborn)
Trachyleberis midwayensis (Alexander)
Trachyleberis spiniferrima (Jones and Sherborn)
Trachyleberis bassleri (Ulrich)

Beaufort County

Number 5

Location: 2 miles north of Pinetown, North Carolina, on the north bank of Pungo Creek, 200 yards east of the Southern Railroad bridge crossing over Pungo Creek.
Owner: J. R. Respass
Date drilled: 1952
Driller: Truman Sawyer
Elevation of well: 17 feet above sea level

Hydrologic Information

Diameter of well: 2 inches
Depth of well: 190 feet
Cased to: 180 feet
Finish: open end
Static water level: Unknown
Yield: Unknown

Remarks: White limestone reported at 180 feet. No sample of the rock available.

Log of Well

Depth (feet)

0-80 No sample.

Upper Miocene—Yorktown formation

80-90 Marl, gray; 20 percent fine to medium-grained subangular quartz sand. 35 percent broken shell fragments. 45 percent blue-gray clay matrix, unconsolidated but tight. Ostracoda and Foraminifera abundant.

90-100 Marl, gray; Same as 80-90-foot interval. Ostracoda and Foraminifera abundant.

100-110 Marl, gray; Same as 80-90-foot interval. Ostracoda and Foraminifera abundant.

110-120 Marl, gray; 15 percent fine-grained angular quartz sand. 45 percent coarse broken shell fragments. 40 percent blue-gray clay matrix, unconsolidated. Ostracoda rare and Foraminifera abundant.

120-130 Marl, gray; Same as 110-120-foot interval. Ostracoda rare and Foraminifera abundant.

Ostracoda in samples from 80-130-feet include:
Puriana rugipunctata (Ulrich and Bassler)
Hemicythere confragosa Edwards
Hemicythere conradi Howe and McGuirt
Hemicythere laevicula Edwards
Loxoconcha reticularis Edwards

Beaufort County

Number 6

Location: Stratigraphic test hole on the L. M. Drum farm which is located 0.7 mile east of Swindell, North Carolina, on the unnumbered county road connecting Swindell and Pantego, North Carolina.
Owner: American Metals Co.
Date drilled: 1952
Driller: Heater Well Co.
Elevation of test hole: 9 feet above sea level

Hydrologic Information

No hydrologic information is available for the test hole which was drilled to a depth of 200 feet. The following hydrologic information is from a water well located 350 yards south of the test hole.
Diameter of well: 2 inches
Depth of well: 231 feet
Cased to: 200 feet
Finish: open end
Static (nonpumping) water level: 3 feet below land surface which is 9 feet above sea level (October 1954)
Yield: Unknown
Temperature: 61°F (October 1954)
Chemical analysis of water available

Log of Test Hole

Depth (feet)

Post-Miocene—surficial sands and clays

18-40 Sand and clay, gray; 60 percent fine-grained angular quartz sand. 40 percent gray silt and clay matrix, unconsolidated. No microfossils.

40-50 Sand and clay, gray; Same as 18-40-foot interval.

Upper Miocene—Yorktown formation

50-70 Marl, light-gray, 30 percent medium to fine-grained subrounded to subangular quartz sand. 50 percent broken and abraded shell fragments. 20 percent blue clay matrix, unconsolidated. Ostracoda and Foraminifera rare.

70-80 Marl, gray to blue; 40 percent fine to medium-grained angular to subangular quartz sand. 35 percent broken and abraded shell fragments. 25 percent blue clay matrix, unconsolidated.

80-97 Sand, gray; 80 percent fine-grained subangular water-polished quartz sand. 20 percent blue clay matrix, unconsolidated. Broken shell fragments less than 1 percent. Ostracoda and Foraminifera common.

97-100 Marl, gray; 30 percent fine to very fine-grained angular quartz sand. 30 percent broken abraded shell fragments. 40 percent blue-gray clay matrix, unconsolidated. Ostracoda and Foraminifera rare.

100-110 Marl, gray; Same as 97-100-foot interval.

110-120 Marl, gray; 10 percent very fine-grained angular quartz sand. 25 percent broken abraded shell fragments. 65 percent blue clay matrix, unconsolidated but tight. Ostracoda rare, Foraminifera common.

120-130 Marl, gray; Same as 110-120-foot interval. Ostracoda rare and Foraminifera common.

130-140 Marl, gray; 35 percent medium to fine-grained subrounded to subangular quartz sand. 50 percent broken shell fragments. 15 percent blue clay matrix, unconsolidated. Ostracoda rare, Foraminifera abundant.

Ostracoda in samples from 50-130-feet include:
Cytherura elongata Edwards
Murrayina martini (Ulrich and Bassler)
Hemicythere conradi Howe and McGuirt
Loxoconcha reticularis Edwards
Loxoconcha purisubrhomboidea Edwards
Cushmanidea ashermani (Ulrich and Bassler)

Middle Miocene (?)—unnamed unit

140-142 Phosphatic sand, brown; 55 percent medium to fine-grained subangular water-polished quartz sand. 30 percent medium to coarse-grained collophane spherules and shards. 15 percent brown silt and clay matrix, unconsolidated. No microfossils.

Remarks: The bottom interval, 140-142-feet is placed in the Middle Miocene (?) because of lithologic similarity to Middle Miocene (?) strata occurring in other wells. No Ostracoda or Foraminifera were recovered from the 140-142-foot interval.

Beaufort County

Number 7

Location: Stratigraphic test hole on the farm of W. T. Wallace which is located along a dirt road 0.8 mile northwest from the junction of the dirt road and N. C. Route 92, 2.3 miles west of Bath, North Carolina.
Owner: American Metals Co.
Driller: Heater Well Co.
Date drilled: 1952:
Elevation of test hole: 14 feet above sea level

Hydrologic Information

No hydrologic information regarding this test hole was recorded. The following information was recorded for a well, 400 feet east of the test hole, drilled in 1949.
Diameter of well: 2 inches
Static (nonpumping) water level: 1 foot below land surface which is 14 feet above sea level (measured March 31, 1954)
Depth of well: 228 feet
Yield: Tested at 175 gallons a minute (1953)
Cased to: 228 feet
Finish: open end
Chemical analysis of water available

Log of Test Hole

Depth (feet)

Post-Miocene—surficial sands

0-10 Sand, tan; 80 percent fine to medium-grained angular to subrounded abraded quartz sand. 20 percent tan silt and clay matrix, unconsolidated. No microfossils.

Upper Miocene—Yorktown formation

60-70 Sand and clay, gray; 60 percent medium to fine-grained subrounded to subangular quartz sand. 40 percent blue-gray clay matrix, unconsolidated. Trace of broken shell fragments. Ostracoda and Foraminifera common.

70-80 Sand and clay, gray; Same as 60-70-foot interval. Ostracoda and Foraminifera common.

80-90 Sand and clay, gray; Same as 60-70-foot interval with shell fragments increasing to 10 percent at the expense of the clay matrix. Ostracoda and Foraminifera abundant.

90-100 Sand and clay, gray; Same as 80-90-foot interval. Ostracoda and Foraminifera abundant.

Ostracoda in samples from 60-90-feet include:
Cytherura elongata Edwards
Echinocythereis planibasilis (Ulrich and Bassler)
Orionina vaughani (Ulrich and Bassler)
Loxoconcha purisubrhomboidea Edwards
Cytheretta reticulata Edwards
Cushmanidea ashermani (Ulrich and Bassler)

Middle Miocene (?)—unnamed unit

100-110 Phosphatic sand, brown; 25 percent fine to medium-grained subangular to subrounded quartz sand. 45 percent medium to coarse-grained collophane spherules and shards. 30 percent brown silt and clay matrix, unconsolidated. No Ostracoda, Foraminifera common.

110-119 Phosphatic sand, brown; 35 percent medium-grained subangular quartz sand. 50 percent medium-grained collophane spherules and shards. 15 percent brown silt and clay matrix, unconsolidated. No Ostracoda, Foraminifera very rare.

No Ostracoda were recognized in the phosphatic sand intervals between 110-119-feet. The top of this phosphatic zone is marked by the presence of abundant specimens of *Siphogenerina spinosa* (Bagg), and *Nonion incisum* (Cushman). The phosphatic sands are placed in the Middle Miocene (?).

Middle Eocene—lower part of Castle Hayne limestone

120-130 Sandy, dolomitic limestone, white; 40 percent medium-grained subangular water-polished quartz sand. 50 percent white recrystallized dolomitic limestone, hard and well cemented. 10 percent black to brown collophane spherules. Ostracoda and Foraminifera very rare.

130-140 Sandy, dolomitic limestone, white; 20 percent medium-grained subrounded to subangular quartz sand. 75 percent recrystallized dolomitic limestone, very hard and well consolidated. 5 percent black to brown collophane spherules. Ostracoda and Foraminifera rare.

140-150 Sandy, dolomitic limestone, white; Same as 130-140-foot interval. Ostracoda and Foraminifera common.

150-160 Sandy, dolomitic limestone, white; Same as 130-140-foot interval. Ostracoda and Foraminifera rare.

160-170 Sandy, dolomitic limestone, white; Same as 130-140-foot interval. Ostracoda very abundant, Foraminifera very rare.

170-186 Sandy, dolomitic limestone, white; Same as 130-140-foot interval. Ostracoda and Foraminifera common.

186-188 Calcareous sand, gray; 50 percent medium-grained subangular to subrounded quartz sand. 25 percent reworked dolomitic limestone fragments. 10 percent dark-green fine-grained glauconite. 15 percent gray silt and clay matrix, unconsolidated. Ostracoda and Foraminifera common.

Ostracoda occurring in the 120-188-foot intervals include:
Cytheridea (Clithrocytheridea) virginica (Schmidt)
Trachyleberis rukasi (Gooch)
Trachyleberis bassleri (Ulrich)
Trachyleberis pellucinoda (Swain)
Actinocythereis stenzeli (Stephenson)
Loxoconcha creolensis Howe and Chambers
Buntonia howei (Stephenson)
Ostracoda are rare above the 140-foot interval.

Beaufort County

Number 8

Location: South shore of the Pungo River at Woodstock Point, 2.4 miles north of Winsteadville, North Carolina.
Owner: Walter Johnson
Driller: Truman Sawyer
Date drilled: 1952
Elevation of well: 6 feet above sea level

Hydrologic Information

Diameter of well: 2 inches
Static (nonpumping) water level: 5 feet above land surface
Depth of well: 240 feet
Yield: 10 gallons per minute (flow, 1954)
Cased to: 230 feet
Temperature: 62°F
Finish: open end
Chemical analysis of water available
Remarks: Very strong odor of hydrogen sulphide around the well. Water tastes very strongly of hydrogen sulphide.

Log of Well

Depth (feet)	
0-65	No sample.
	Upper Miocene—Yorktown formation
65-75	Sand, white; 80 percent fine-grained angular to subangular quartz sand. 15 percent light-gray to white calcareous clay matrix, loosely consolidated. 5 percent broken shell and limestone fragments. Ostracoda and Foraminifera abundant.
75-85	Sand, white; Same as 65-75-foot interval.
85-95	Sand, white; 90 percent fine-grained subangular quartz sand; grain surfaces predominantly etched and frosted. 10 percent gray calcareous clay matrix, loosely consolidated. Trace of broken abraded shell and limestone fragments. Abundant Ostracoda and Foraminifera.
95-105	Sand, white; Same as 85-95-foot interval, with trace of medium-grained black phosphate nodules. Abundant Ostracoda and Foraminifera.
105-115	Sand, white; Same as 95-105-foot interval.
115-125	Marl, white; 55 percent fine-grained angular quartz sand. 35 percent cream-colored shell fragments. 10 percent white to light-gray calcareous clay matrix, loosely consolidated. Trace of black phosphate nodules. Ostracoda and Foraminifera abundant.
135-145	Marl, white; Same as 115-125-foot interval.
145-165	Marl, gray; Same as 115-125 foot-interval with matrix changing from white to gray in color. Ostracoda and Foraminifera abundant.

Ostracoda from 65-165-feet include:
Cytheridea (Haplocytheridea) proboscidiala Edwards
Leguminocythereis whitei Swain
Actinocythereis exanthemata (Ulrich and Bassler)
Echinocythereis garretti (Howe and McGuirt)
Murrayina martini (Ulrich and Bassler)
Orionina vaughani (Ulrich and Bassler)
Hemicythere conradi Howe and McGuirt
Loxoconcha purisubrhomboidea Edwards
Cushmanidea ashermani (Ulrich and Bassler)

	Middle Miocene(?)—unnamed unit
168-180	Phosphatic sand, brown to gray; 50 percent fine-grained angular quartz sand. 30 percent fine-grained tan to black collophane spherules and shards. 20 percent brown silt and clay matrix, unconsolidated.
200-210	Phosphatic sand, brown; Same as 168-180-foot interval with 5 percent increase in collophane percentage. No microfossils.
	Middle Eocene—lower part of Castle Hayne limestone
230-240	Sandy limestone; white; 30 percent fine-grained angular water-polished quartz sand. 70 percent white chalky limestone moderately indurated and hard in streaks. Ostracoda and Foraminifera rare.

Ostracoda from 230-240-feet include:
Cytheridea (Haplocytheridea) montgomeryensis Howe and Chambers
Trachyleberis rukasi (Gooch)
Trachyleberis pellucinoda (Swain)
Trachyleberis bassleri (Ulrich)

Beaufort County
Number 9

Location: On N. C. Route 99, 2.5 miles north of the post office at Pungo, North Carolina.
Owner: Joseph Adams
Driller: Hudson Well Co.
Date drilled: 1953
Elevation of well: 9 feet above sea level

Hydrologic Information

Diameter of well: 2 inches
Static (nonpumping) water level: 5.4 feet above land surface (June 22, 1955)
Depth of well: 295 feet
Yield: Flows at 11 gallons a minute (June 1953)
Cased to: 290 feet
Finish: open end
Chemical analysis of water available

Log of Well

Depth (feet)	
	Post-Miocene—surficial sands and clays
10-20	Sand, tan; 80 percent medium-grained subrounded quartz sand. 20 percent tan silt and clay matrix, unconsolidated.
20-30	Clay and sand, tan, 25 percent medium to fine-grained subrounded to angular quartz sand. 75 percent tan clay matrix, unconsolidated but tight.
	Upper Miocene—Yorktown formation
30-50	Sandy marl, gray; 40 percent medium-grained subangular quartz sand. 25 percent broken and abraded shell fragments. 35 percent gray clay matrix, unconsolidated. Ostracoda and Foraminifera common.
50-65	Sandy marl, gray; Same as 30-50-foot interval. Ostracoda and Foraminifera common.
65-80	Sandy marl, gray; Same as 35-50-foot interval with slight increase in shell content. Ostracoda and Foraminifera rare.
80-100	Sandy marl, gray; Same as 65-80-foot interval.
110-130	Sandy marl, gray; 25 percent fine to medium-grained subangular quartz sand. 45 percent coarse broken abraded shell fragments. 30 percent gray clay matrix, unconsolidated. Ostracoda and Foraminifera common.
140-155	Sandy marl, gray; Same as 110-130-foot interval. Ostracoda and Foraminifera common.
160-180	Sandy marl, gray; Same as 110-130-foot interval. Ostracoda rare, Foraminifera very abundant. Rotaliidae comprise about 95 percent of the foraminiferal fauna.
190-205	Marl, gray; 15 percent fine-grained subangular to angular quartz sand. 35 percent broken abraded shell fragments. 50 percent gray clay matrix, unconsolidated. Ostracoda rare, Foraminifera very abundant. Rotaliidae comprise about 95 percent of the foraminiferal fauna.

Ostracoda occurring in the 30-205-foot interval include:
Paracythereidea vandenboldi Puri
Leguminocythereis whitei Swain
Murrayina martini (Ulrich and Bassler)
Hemicythere conradi Howe and McGuirt
Hemicythere confragosa Edwards
Cushmanidea ashermani (Ulrich and Bassler)

	Middle Miocene—unnamed unit
210-230	Phosphatic sand, brown; 45 percent medium-grained subangular to subrounded quartz sand. 35 percent medium-grained brown collophane spherules and shards. 20 percent brown silt and clay matrix, unconsolidated. No Ostracoda or Foraminifera.

Remarks: Samples below 230-feet were not saved from this well. According to the description of the well cuttings as observed by the well owner during drilling operations the following information is inferred by the writer. The Castle Hayne limestone of middle Eocene age was first encountered at 290 feet in this well. The middle Miocene phosphatic sands are 80 feet thick and extend from 210 to 290 feet.

Beaufort County
Number 10

Location: Well number 2 at the town of Aurora.
Owner: Town of Aurora
Driller: A. L. Lupton
Date drilled: 1953
Elevation of well: 8 feet above sea level

Hydrologic Information

Diameter of well: 2 inches
Static (nonpumping) water level: Unknown
Depth of well: 200 feet
Yield: Unknown
Cased to: 190 feet
Finish: open end

Log of Well

Depth (feet)	
0-30	No sample.
	Upper Miocene—Yorktown formation
30-40	Sandy marl, gray; 30 percent medium-grained subrounded quartz

sand. 25 percent broken shell fragments. 45 percent gray clay matrix, unconsolidated. Ostracoda and Foraminifera common.

40-50 Sandy marl, gray; Same as 30-40-foot interval. Ostracoda and Foraminifera common.

50-60 Sandy marl, gray; Same as 30-40-foot interval. Ostracoda and Foraminifera common.

70-80 Sandy marl gray; Same as 30-40-foot interval with a slight increase in shell content. Trace of black phosphate grains. Ostracoda and Foraminifera common.

80-90 Sandy marl, gray; Same as 70-80-foot interval. Ostracoda and Foraminifera common.

100-120 Marl, white; 10 percent medium-grained rounded quartz sand. 60 percent coarse broken abraded shell and limestone fragments. 25 percent gray clay matrix, unconsolidated. 5 percent black and brown phosphate grains. Ostracoda and Foraminifera rare.

140-150 Marl, white; Same as 100-120-foot interval. Ostracoda and Foraminifera rare.

150-180 Sandy marl, gray; 35 percent fine to coarse-grained angular to subrounded quartz sand. 30 percent coarse broken shell fragments. 25 percent gray to brown clay matrix, unconsolidated. 10 percent black phosphate pebbles. Ostracoda and Foraminifera common.

Ostracoda from 30-180-feet include:
Puriana rugipunctata (Ulrich and Bassler)
Actinocythereis exanthemata (Ulrich and Bassler)
Orionina vaughani (Ulrich and Bassler)
Hemicythere conradi Howe and McGuirt
Hemicythere confragosa Edwards
Cushmanidea ashermani (Ulrich and Bassler)

Middle Eocene—lower part of Castle Hayne limestone

180-190 Sandy, dolomitic limestone, light-gray; 40 percent medium-grained subrounded quartz sand. 60 percent partially-recrystallized dolomitic shell fragments and calcareous matrix, well consolidated and very hard. Ostracoda and Foraminifera common.

Ostracoda occurring in the 180-190-foot interval include:
Cytherelloidea danvillensis Howe, var.
Paracypris franquesi Howe and Chambers
Brachycythere watervalleyensis Howe and Chambers
Actinocythereis davidwhitei (Stadnichenko)
Loxoconcha claibornensis Murray
Cytheretta alexanderi Howe and Chambers

Remarks: The most common ostracode in the 150-180-foot interval is apparently a new species which is very close to *Cythereis* (?) *vicksburgensis* Howe and Law. It is somewhat more coarsely sculptured than that species and bears two very subdued wing-like projections above the dorsal and ventral margins. This species has not been recognized in any other well.

Bertie County

Number 1

Location: Windsor, North Carolina, well at rear of water treatment plant.
Owner: Town of Windsor
Driller: Layne Atlantic Co.
Date drilled: 1953
Elevation of well: 46 feet above sea level

Hydrologic Information

Diameter of well: 10 inches
Static (nonpumping) water level: 39.3 feet below land surface (1953)
Depth of well: 405 feet
Yield: 250 gallons a minute
Cased to: 405 feet
Chemical analysis of water available
Finish: gravel wall and screens

Log of Well

Depth (feet)

Post-Miocene—surficial sands

0-22 Sand, tan; 75 percent fine-grained angular to subangular quartz sand. 15 percent tan clay matrix, unconsolidated. 10 percent coarse blocky grains of potash feldspar. Trace of coarse mica flakes.

Upper Miocene—Yorktown formation

22-42 Sand and clay, gray; 65 percent medium to fine-grained subrounded to subangular quartz sand. 25 percent blue-gray clay matrix, unconsolidated but tight. 10 percent fine broken shell fragments. Trace of coarse mica flakes. Ostracoda and Foraminifera common.

42-57 Sand and clay, gray; 55 percent fine to medium-grained subangular quartz sand. 35 percent blue-gray clay matrix, unconsolidated. 10 percent fine broken shell fragments. Trace of dark-green fine-grained glauconite. Ostracoda and Foraminifera common.

57-70 Sand and clay, gray; Same as 42-57-foot interval with slight increase in percentage of shell fragments. Ostracoda and Foraminifera abundant.

Ostracoda from the 22-57-foot intervals include:
Puriana rugipunctata (Ulrich and Bassler)
Murrayina martini (Ulrich and Bassler)
Orionina vaughani (Ulrich and Bassler)
Hemicythere conradi Howe and McGuirt
Hemicythere confragosa Edwards
Hemicythere schmidtae Malkin

Paleocene—unnamed unit

70-83 Sand, gray; 70 percent coarse to medium-grained subrounded quartz sand. 20 percent light-gray calcareous clay matrix, indurated and moderately consolidated. 10 percent dark-green coarse-grained glauconite. Authigenic pyrite and pyrite aggregates prominent. Trace of coarse broken abraded shell fragments. Ostracoda and Foraminifera common.

83-96 Glauconitic sand, "salt and pepper"; 50 percent coarse-grained subrounded to subangular quartz sand. 25 percent dark-green coarse-grained glauconite. 25 percent white calcareous clay matrix, indurated and moderately consolidated. Trace of coarse broken abraded shell fragments. Ostracoda and Foraminifera common.

96-134 Glauconitic sand, "salt and pepper"; 30 percent medium-grained subrounded to subangular quartz sand. 50 percent dark-green medium-grained glauconite. 20 percent calcareous clay and silt matrix, unconsolidated. Ostracoda and Foraminifera common.

134-144 Glauconitic sand, "salt and pepper"; 40 percent coarse-grained subangular quartz sand. 25 percent dark-green coarse-grained glauconite. 35 percent calcareous clay matrix, indurated and well consolidated.

Ostracoda from the 70-134-foot intervals include:
Cytheridea (Haplocytheridea) ruginosa Alexander
Brachycythere interrasilis Alexander
Brachycythere plena Alexander
Trachyleberis midwayensis (Alexander)
Trachyleberis prestwichiana (Jones and Sherborn)
Trachyleberis bassleri (Ulrich)

Upper Cretaceous—Peedee formation

144-165 Clay and sand, gray; 25 percent fine to medium-grained angular to subangular water-polished quartz sand. 75 percent gray clay matrix, unconsolidated but compact. Dark-green fine-grained glauconite prominent. Trace of coarse mica flakes. Ostracoda and Foraminifera common.

165-185 Clay and sand, gray; Same as 144-165-foot interval with slight increase of coarse mica flakes. Ostracoda and Foraminifera common.

185-206 Sand, gray; 70 percent medium-grained subrounded to subangular well-sorted quartz sand. 20 percent gray micaceous clay matrix, unconsolidated. 10 percent dark to light-green fine-grained glauconite. Trace of broken abraded shell fragments. Ostracoda and Foraminifera common.

206-226 Sand, gray; 90 percent very fine-grained angular quartz sand. 10 percent gray micaceous clay matrix, unconsolidated but compact. Pyrite aggregates prominent. Trace of dark-green fine-grained glauconite and phosphate spherules. Ostracoda and Foraminifera rare.

Ostracoda from the 144-226-foot intervals include:
Cytherella herricki Brown
Cytherelloidea swaini Brown
Cytherelloidea sohni Brown
Brachycythere rhomboidalis (Berry)
Trachyleberis pidgeoni (Berry)
Trachyleberis (?) *praecursora* Brown

Upper Cretaceous—Black Creek formation

226-246 Sand and gravel, tan; 50 percent coarse to fine-grained subrounded to angular quartz sand. 30 percent fine rounded gravel. 20 percent tan clay and silt matrix, unconsolidated. Pyrite aggregates

and coarse blocky potash feldspar grains prominent. Trace of dark-green glauconite. Ostracoda and Foraminifera very rare.

246-266 Sand, tan; 80 percent medium to coarse-grained subrounded quartz sand. 15 percent tan clay matrix, unconsolidated. 5 percent light-green fine-grained glauconite. Pyrite aggregates and coarse potash feldspar grains prominent. Ostracoda and Foraminifera very rare.

266-288 Sand, tan; Same as 246-266-foot interval with the addition of prominent hematite aggregates. Ostracoda common, Foraminifera very rare.

288-308 Sand and clay, tan to gray; 60 percent coarse to fine-grained subrounded to angular poorly-sorted quartz sand. 35 percent tan to gray clay matrix, unconsolidated. 5 percent light-green medium-grained glauconite. Pyrite and hematite aggregates prominent. No microfossils.

308-330 Sand and clay, tan to gray; Same as 288-308-foot interval. No Ostracoda, Foraminifera very rare.

330-350 Sand and clay, tan to gray; Same as 288-308-foot interval. No microfossils.

350-370 Sand and clay, tan to gray; Same as 288-308-foot interval. No microfossils.

370-400 Sand and clay, gray; 60 percent very coarse to fine-grained subrounded to angular poorly-sorted quartz sand. 35 percent gray clay matrix, unconsolidated but compact. 5 percent light-green medium-grained glauconite. Pyrite and hematite aggregates prominent. Trace of broken abraded shell fragments. No microfossils.

400-405 Clay, brick-red; 10 percent subrounded medium gravel. 90 percent brick-red clay matrix, unconsolidated but very compact. Hematite aggregates prominent in washed residue. Trace of dark to light-green fine-grained glauconite and coarse mica flakes. Ostracoda and Foraminifera rare.

Ostracoda occurring in the 226-400-foot intervals include:
Cytheridea (Haploeytheridea) monmouthensis Berry
Cytheridea (Haploeytheridea) cf. *H. berryi* (Swain)
Trachyleberis austinensis (Alexander)
Protoeythere paratriplicata Swain

Remarks: The occurrence of *Citharina texana* (Cushman) in the 266-288-foot interval and the occurrence of *Trachyleberis austinensis* (Alexander) in the 400-405-foot interval suggests an Austin age, and it seems probable that the upper Snow Hill marl member of the Black Creek formation, which is of Taylor age, is absent in this well.

Bertie County

Number 2

Location: Mt. Gould, North Carolina
Owner: Unknown
Driller: Magette Well Co.
Date drilled: 1954
Elevation of well: 31 feet above sea level

Hydrologic Information

Diameter of well: 4 inches to 2 inches
Static (nonpumping) water level: Unknown
Depth of well: 370 feet
Yield: Unknown
Cased to: 370 feet
Finish: screens

Log of Well

Depth (feet)

Post-Miocene—surficial sands and clays

0-21 Sand and clay, gray; 75 percent medium-grained subangular well-sorted quartz sand. 25 percent gray clay matrix, unconsolidated. No microfossils.

Upper Miocene—Yorktown formation

21-40 Sand and clay, dark-gray; 65 percent medium to fine-grained subrounded to angular quartz sand. 35 percent blue-gray clay matrix, unconsolidated but compact. Fresh broken shell fragments prominent. Ostracoda and Foraminifera common.

40-70 Marl, gray; 35 percent medium to fine-grained subangular to angular quartz sand. 25 percent coarse broken abraded shell fragments. 40 percent blue-gray clay matrix, unconsolidated. Ostracoda and Foraminifera common.

70-142 Marl, gray; Same as 40-70-foot interval with slight increase in shell content. Ostracoda and Foraminifera common.

Ostracoda from the 21-142-foot intervals include:
Leguminoeythereis whitei Swain
Puriana rugipunctata (Ulrich and Bassler)
Orionina vaughani (Ulrich and Bassler)
Hemieythere conradi Howe and McGuirt
Hemieythere confragosa Edwards
Loxoconcha purisubrhomboidea Edwards
Cytheromorpha sp. aff. *C. warneri* Howe and Spurgeon
Cushmanidea ashermani (Ulrich and Bassler)

Paleocene—unnamed unit

142-177 Sand, light-gray; 80 percent medium to fine-grained angular quartz sand. 15 percent light-gray clay matrix, unconsolidated. 5 percent dark-green medium-grained glauconite. Ostracoda and Foraminifera common.

177-234 Sand, "salt and pepper"; 55 percent medium to fine-grained angular water-polished quartz sand. 30 percent dark-green fine-grained glauconite. 15 percent light-gray clay matrix, unconsolidated. Trace of broken shell fragments. Ostracoda and Foraminifera common.

234-265 Glauconitic, calcareous sand, "salt and pepper"; 25 percent medium-grained subangular quartz sand. 40 percent dark-green medium-grained glauconite. 35 percent cream-colored calcareous matrix, indurated and well consolidated. Euhedral pyrite crystals, filling shrinkage fissures in glauconite grains, prominent. Trace of broken shell fragments. Ostracoda and Foraminifera rare.

265-305 Glauconitic sand, "salt and pepper"; 60 percent medium to fine-grained subangular to angular quartz sand. 25 percent dark-green medium to fine-grained glauconite. 15 percent gray clay matrix, indurated and moderately consolidated. Euhedral pyrite, filling shrinkage fissures in glauconite grains, prominent. Ostracoda and Foraminifera common.

305-335 Glauconitic sand, "salt and pepper"; Same as 265-305-foot interval. Ostracoda and Foraminifera common.

335-370 Glauconitic sand, dark-green; 10 percent medium to fine-grained subangular to angular quartz sand. 85 percent very dark-green coarse to medium-grained glauconite. 5 percent gray clay matrix, unconsolidated. Trace of coarse broken shell fragments. Ostracoda and Foraminifera rare.

Ostracoda from the 142-335-foot intervals include:
Bairdia cf. *B. magna* Alexander
Brachycythere interrasilis Alexander
Trachyleberis spinifferima (Jones and Sherborn)
Trachyleberis midwayensis (Alexander)
Orthonotacythere eristata Alexander

Remarks: One or more thin indurated sand strata occur in the 234-265-foot interval. Sample spacing was not fine enough to determine the thickness or number of such strata. Glauconite in this well appears to be black in a hand specimen. Under the microscope the color is more nearly a very dark-green and is so described.

Brunswick County

Number 1

Location: Sunny Point, well number 6 at U. S. Army Ammunition Depot.
Owner: U. S. Army
Driller: Carolina Drilling Co.
Date drilled: 1953
Elevation of well: 35.5 feet above sea level

Hydrologic Information

Diameter of well: 10 inches
Static (nonpumping) water level: 9 feet below land surface (1953)
Depth of well: 198 feet
Yield: Tested at 250 gallons a minute. (1953)
Cased to: 46 feet
Finish: open end
Temperature: 66°F

Log of Well

Depth (feet)

0-20 No sample.

Post Miocene—surficial sands

20-37 Sand, gray; 90 percent medium to coarse-grained subrounded quartz

sand. 10 percent gray clay matrix, unconsolidated. Trace of coarse mica flakes. Pitted and etched surfaces on quartz grains predominant. No microfossils.

45-50 Sand, gray; 70 percent coarse to medium-grained subangular quartz sand. 20 percent light-gray clay matrix, unconsolidated. 10 percent coarse broken shell and limestone fragments. No Ostracoda, Foraminifera very rare.

Upper (?) *Eocene*—upper part of Castle Hayne limestone

59-62 Marl, light-gray; 30 percent coarse to medium-grained subrounded quartz sand. 40 percent coarse broken abraded shell and limestone fragments. 30 percent calcareous clay matrix, indurated and loosely consolidated. Ostracoda and Foraminifera rare.

65-73 Shell limestone, white; 10 percent fine to medium-grained angular to subangular quartz sand. 90 percent coarse broken shell fragments and calcareous matrix, indurated and well consolidated. Ostracoda rare, Foraminifera common, recrystallized.

73-78 Sandy, dolomitic limestone, cream; 25 percent fine to medium-grained subangular quartz sand. 75 percent dolomitic limestone matrix, weathered and soft. Ostracoda rare, Foraminifera common, recrystallized.

78-96 Sandy, dolomitic limestone, cream; Same as 73-78-foot interval. Ostracoda and Foraminifera rare, recrystallized.

96-119 Sandy, dolomitic limestone, cream; Same as 73-78-foot interval, unweathered and very hard. Ostracoda and Foraminifera very rare, recrystallized.

119-124 Calcareous sand, light-gray; 55 percent medium to fine-grained subrounded to angular quartz sand. 25 percent partially-recrystallized shell and limestone fragments. 20 percent gray clay matrix, unconsolidated but compact. Ostracoda and Foraminifera rare, recrystallized.

124-134 Calcareous sand, light-gray; Same as 119-124-foot interval. Ostracoda and Foraminifera rare, recrystallized.

134-144 Shell limestone, light-gray; 15 percent fine to medium-grained angular to subangular quartz sand. 65 percent coarse broken shell fragments. 20 percent white limestone matrix, moderately consolidated. No Ostracoda, Foraminifera rare, recrystallized.

144-149 Shell limestone, light-gray; Same as 134-144-foot interval. Ostracoda and Foraminifera very rare, recrystallized.

Ostracoda occurring in the 59-144-foot intervals include:
Cytherelloidea danvillensis Howe var.
Bairdia sp. *A.*
Brachycythere watervalleyensis Howe and Chambers
Trachyleberis sp. *C.*
Cytheretta alexanderi Howe and Chambers

Upper Cretaceous—Peedee formation

149-154 Sand and clay, gray; 70 percent very fine to medium-grained angular to subrounded poorly-sorted quartz sand. 30 percent gray calcareous clay matrix, unconsolidated but compact. Dark-green fine-grained glauconite prominent. Trace of broken shell fragments. Ostracoda and Foraminifera common, recrystallized.

154-166 Sand and clay, gray; Same as 149-154-foot interval. Ostracoda and Foraminifera common, recrystallized.

166-176 Sand and clay, gray; Same as 149-154-foot interval. Ostracoda and Foraminifera common, recrystallized.

176-188 Sand, gray; 85 percent medium to fine-grained subrounded to angular quartz sand. 10 percent gray clay matrix, unconsolidated. 5 percent light-green fine-grained glauconite. Broken shell fragments prominent. Ostracoda common, Foraminifera rare.

188-198 Sand and clay, gray; 60 percent fine to medium-grained subangular to subrounded quartz sand. 40 percent gray clay matrix, indurated and loosely consolidated. Trace of dark-green fine-grained glauconite and broken shell fragments. Ostracoda common, Foraminifera rare.

Ostracoda occurring in the 149-188-foot intervals include:
Bairdoppilata pondera Jennings
Cytherura glossensis Brown
Eucytherura curta (Jennings)
Trachyleberis communis (Israelsky)
Platycythereis costatana angula (Schmidt)
Loxoconcha neuseensis Brown

Brunswick County

Number 2

Location: Leland, North Carolina, Leland Colored High School.
Owner: Brunswick County
Driller: Blake
Date drilled: 1953
Elevation of well: 25 feet above sea level

Hydrologic Information

Diameter of well: 6 inches
Static (nonpumping) water level: Unknown
Depth of well: 300 feet
Yield: Unknown
Cased to: 200 feet
Finished: abandoned due to excessive chloride

Log of Well

Depth (feet)

Post-Miocene—surficial sands

0-10 Sand, tan; 90 percent coarse to medium-grained subrounded to subangular quartz sand. 10 percent tan clay matrix, unconsolidated. Limonitic staining of quartz grains prominent.

Upper Cretaceous—Peedee formation

10-20 Sand, tan; 85 percent fine to very fine-grained angular quartz sand. 15 percent tan clay matrix, unconsolidated. Trace of dark-green fine-grained glauconite and coarse mica flakes. No microfossils.

20-30 Sand and clay, black; 75 percent fine-grained angular well-sorted quartz sand. 25 percent black micaceous clay matrix, unconsolidated but compact. Trace of very fine-grained glauconite. No Ostracoda, dwarf Foraminifera very rare.

30-40 Sand, gray; 90 percent fine-grained angular well-sorted quartz sand. 10 percent gray micaceous clay matrix, unconsolidated. Trace of fine-grained glauconite. Ostracoda very rare, dwarf Foraminifera rare.

40-60 Sand, gray; Same as 30-40-foot interval. No Ostracoda, dwarf Foraminifera very rare.

60-70 Sand and clay, black; 70 percent fine to very fine-grained angular quartz sand. 30 percent black micaceous clay matrix, unconsolidated but very compact. No Ostracoda, dwarf Foraminifera very rare.

70-80 Sand and clay, black; Same as 60-70-foot interval. No Ostracoda, dwarf Foraminifera very rare.

80-100 Sand and clay, dark-gray; Same as 60-70-foot interval with a slight color change. No Ostracoda, dwarf Foraminifera very rare.

100-110 Sand and clay, dark-gray; Same as 80-100-foot interval. Ostracoda very rare, dwarf Foraminifera rare.

110-130 Sand and clay, drak-gray; Same as 80-100-foot interval. No Ostracoda, dwarf Foraminifera rare.

130-145 Sand and clay, dark-gray; Same as 80-100-foot interval. Ostracoda very rare, dwarf Foraminifera common.

145-165 Clay and sand, light-gray; 35 percent very fine-grained angular quartz sand. 65 percent calcareous micaceous clay matrix, indurated and loosely consolidated. Dark-green very fine-grained glauconite prominent. No Ostracoda, dwarf Foraminifera abundant.

165-180 Clay and sand, light-gray; Same as 145-165-foot interval. No Ostracoda, dwarf Foraminifera abundant.

180-205 Clay and sand, light-gray; Same as 145-165-foot interval. Ostracoda very rare, dwarf Foraminifera common.

205-233 Sand and clay, dark-gray; 60 percent very fine to medium-grained angular to subangular quartz sand. 40 percent black micaceous clay matrix, unconsolidated but compact. Trace of dark-green very fine-grained glauconite. No Ostracoda, dwarf Foraminifera rare.

The following Ostracoda were recovered from the cuttings listed below.

Depth (feet)

30-40 *Eucytherura curta* (Jennings)
Trachyleberis pidgeoni (Berry)

100-110 *Eucytherura curta* (Jennings)

130-145 *Velarocythere arachoides* (Berry)

180-205 *Cytherella* sp.
Eucytherura curta (Jennings)

Remarks: Dwarf Foraminifera occur commonly in cuttings from this well. The average diameter of ten specimens of *Anomalina* sp., which were measured, was 0.11 mm.

Camden County

Number 1

Location: Oil test, DuGrandlee Foreman-1, 10 miles northeast of Elizabeth City, North Carolina.
Owner: DuGrandlee Exploration Co.
Driller: DuGrandlee Exploration Co.
Date drilled: 1953
Elevation of well: 16 feet above sea level

Hydrologic Information

None available. This well is included for its stratigraphic value.

Log of Well

Depth (feet)	
0-660	No sample.
	Eocene (?)—undifferentiated
660-680	Limestone, light-gray; 20 percent very fine to fine-grained angular quartz sand. 80 percent calcareous matrix, indurated. Trace of dark-green glauconite and broken abraded shell fragments. No Ostracoda, Foraminifera rare.
680-690	Limestone, light-gray; Same as 660-680-foot interval. No Ostracoda, Foraminifera rare.
	Paleocene—unnamed unit
690-700	Glauconitic sand and shell, light-green; 35 percent coarse to medium-grained subrounded to subangular quartz sand. 25 percent dark-green coarse to medium-grained glauconite. 25 percent coarse broken shell and limestone fragments. 15 percent white calcareous matrix, indurated and moderately consolidated. Coarse-grained phosphate spherules prominent. Ostracoda and Foraminifera common.
700-710	Glauconitic sand and shell; Same as 690-700-foot interval. Ostracoda and Foraminifera common.
710-720	Glauconitic sand and shell; Same as 690-700-foot interval. Ostracoda and Foraminifera common.
720-760	Glauconitic sand and shell, light-green; 45 percent coarse to medium-grained subangular to subrounded quartz sand. 15 percent dark to light-green medium-grained glauconite. 20 percent calcareous clay matrix, indurated and moderately consolidated. 20 percent coarse broken shell and sandy limestone fragments. Ostracoda and Foraminifera common.
760-800	Glauconitic sand and clay, light-gray; 45 percent coarse to medium-grained subrounded to subangular quartz sand. 30 percent dark-green medium-grained glauconite. 25 percent gray calcareous clay matrix, unconsolidated. Broken shell fragments prominent. Ostracoda and Foraminifera common.

Ostracoda from the 690-760-foot intervals include:
Bairdia magna Alexander
Brachycythere cf. *B. verrucosa* Harris and Jobe
Brachycythere interrasilis Alexander
Trachyleberis spiniferrima (Jones and Sherborn)
Trachyleberis bassleri (Ulrich)
Trachyleberis prestwichiana (Jones and Sherbon)

	Paleocene—unnamed unit and *Upper Cretaceous*—Peedee formation—undifferentiated
800-830	Sand and clay, light-gray; 55 percent coarse to medium-grained subrounded to angular quartz sand. 30 percent gray clay matrix, unconsolidated. 15 percent dark-green medium-grained glauconite. Broken shell fragments prominent. Trace of black lignitized wood fragments and fine mica flakes. Ostracoda and Foraminifera rare.
830-940	Sand and clay; dark-gray; 70 percent coarse to fine-grained subangular to angular poorly-sorted quartz sand. 25 percent gray micaceous clay matrix, unconsolidated. 5 percent dark-green glauconite. Black lignitized wood fragments prominent. Ostracoda and Foraminifera very rare.
	Upper Cretaceous—Peedee formation
940-950	Sand, light-gray; 85 percent coarse to medium-grained subangular to angular quartz sand. 15 percent gray clay matrix, unconsolidated. Trace of dark-green glauconite, coarse mica flakes and black lignitized wood fragments. Ostracoda and Foraminifera rare.

Ostracoda from the 940-950-foot interval are:
Cytheridea (Haplocytheridea) monmouthensis Berry
Eucytherura curta (Jennings)
Brachycythere rhomboidalis (Berry)

Remarks: For a generalized log of the complete set of samples from this well the reader is referred to Richards (1954). Richards shows 0-660-feet as Miocene. No samples are available to the writer from this interval. The samples from this well are badly contaminated, contamination increasing with depth, and for that reason no lithologic log is given below the top of the Cretaceous.

Ostracoda below 800 feet are very rare. Foraminifera are more abundant but are generally dwarf species of Globigerinidae and Anomalinidae which are difficult to identify. The top of the Peedee formation is placed at 940 feet on the basis of the first Peedee ostracodes. However, the writer considers the interval from 800 to 940 feet to be questionably of Peedee age, as based on lithology.

The top of the Black Creek formation is placed at 1140 feet, and is based on the highest occurrence of *Brachycythere sphenoides* (Reuss).

Carteret County

Number 1

Location: Well number 1, Marine Corps Air Base, Atlantic, North Carolina.
Owner: U. S. Navy
Driller: Heater Well Co.
Date drilled: 1942
Elevation of well: 15 feet above sea level

Hydrologic Information

Diameter of well: 8 inches
Static (nonpumping) water level: 7 feet below sea level (1942)
Depth of well: 408 feet
Yield: 240 gallons a minute with an 8-foot drawdown
Cased to: 389 feet
Finish: screens

Log of Well

Depth (feet)	
0-20	No sample
	Post-Miocene—sands, clays, and marls
20-30	Sand and silt, dark-brown; 70 percent medium-grained subrounded quartz sand. 30 percent brown silt matrix, unconsolidated. No microfossils.
30-60	Sand and clay, gray; 60 percent fine-grained angular quartz sand. 35 percent gray to blue clay and silt matrix, unconsolidated. 5 percent fine broken shell fragments. No Ostracoda, Foraminifera rare.
60-90	Marl, gray; 45 percent medium-grained subrounded quartz sand. 25 percent fine broken shells. 30 percent gray silt and clay matrix, unconsolidated. Ostracoda rare, Foraminifera common.
90-95	Marl, gray; Same as 60-90-foot interval. Ostracoda rare, Foraminifera common.
95-105	Marl, gray; Same as 60-90-foot interval with 10 percent increase in shell content.
	Upper Miocene—Yorktown formation
105-130	Sandy, dolomitic limestone, gray; 15 percent fine to medium-grained angular to subangular quartz sand. 40 percent dolomitic and partially recrystallized shell fragments. 45 percent dolomitic and calcareous matrix, consolidated and very hard. Ostracoda and Foraminifera rare.
130-140	Sand, gray; 70 percent fine-grained angular quartz sand. 10 percent fresh coarse broken shell fragments. 20 percent gray silt and clay matrix, unconsolidated. Ostracoda rare, Foraminifera common.
140-158	Shell and sand; 25 percent coarse to medium-grained subrounded quartz sand. 60 percent coarse broken and abraded shell fragments. 15 percent gray silt and clay matrix, unconsolidated. Ostracoda and Foraminifera common.
158-180	Sand, gray; 80 percent medium-grained subrounded quartz sand. 20 percent gray silt and clay matrix, unconsolidated. Trace of broken shell fragments. Ostracoda and Foraminifera common.
180-190	Calcareous sand, gray; 65 percent fine-grained angular quartz sand. 35 percent calcareous matrix, hard and well consolidated. Trace of broken shell fragments and phosphate pebbles. Ostracoda and Foraminifera rare.
190-210	Sand and silt, brown; 65 percent fine-grained angular quartz

sand. 35 percent brown silt and clay matrix, loosely consolidated. Ostracoda and Foraminifera rare.

210-220 Marl, gray; 30 percent fine-grained angular quartz sand. 25 percent white chalky shell fragments. 45 percent gray silt and clay matrix, unconsolidated. Ostracoda and Foraminifera common.

220-230 Sandy, dolomitic limestone, gray; 25 percent fine to medium-grained subangular to subrounded quartz sand. 45 percent dolomitic shell fragments. 30 percent dolomitic and calcareous matrix, consolidated and very hard. No microfossils.

230-245 Sand and silt, brown; 55 percent very fine-grained angular quartz sand. 45 percent brown silt and clay matrix, unconsolidated. Trace of collophane spherules and shards. Ostracoda and Foraminifera common.

245-265 Sand and silt, gray; 65 percent fine-grained subangular quartz sand. 30 percent gray calcareous silt and clay matrix, loosely consolidated. 5 percent increase in collophane. Ostracoda and Foraminifera rare.

265-270 Sand and silt, gray; Same as 245-265-foot interval. Ostracoda and Foraminifera common.

270-280 Sand and silt, gray; Same as 245-265-foot interval. No Ostracoda, Foraminifera common.

280-300 Sand and silt, gray; Same as 245-265-foot interval. Ostracoda and Foraminifera common.

300-330 Clay, gray; 20 percent fine-grained angular quartz sand. 80 percent greenish-gray clay matrix, unconsolidated but compact. Ostracoda and Foraminifera common.

330-360 Sandy, dolomitic limestone, light-gray; 30 percent fine to medium-grained subangular to angular quartz sand. 25 percent dolomitic shell fragments. 45 percent dolomitic and calcareous matrix, consolidated and very hard.

360-390 Sand and silt, brown; 60 percent fine-grained angular quartz sand. 40 percent brown silt and clay matrix, unconsolidated. Ostracoda and Foraminifera very rare.

390-400 Sandy, dolomitic limestone, white; 30 percent fine to medium-grained subangular to angular water-polished quartz sand. 25 percent dolomitized, recrystallized shell fragments. 45 percent dolomitic and calcareous matrix, well consolidated and very hard. No microfossils.

Microfossils occurring in the 105-390-foot intervals include:
Cytherura elongata Edwards
Leguminocythereis whitei Swain
Murrayina martini (Ulrich and Bassler)
Hemicythere schmidtae Malkin
Hemicythere confragosa Edwards
Hemicythere conradi Howe and McGuirt

Remarks: No microfossils were recovered from the bottom interval 390-400-feet. This interval may represent the top of the Castle Hayne limestone. However, the unit is included in the Yorktown formation because of lack of diagnostic Ostracoda of Eocene age.

Carteret County

Number 2

Location: Fort Macon State Park, Bogue Banks, North Carolina.
Owner: N. C. State Parks
Driller: Carolina Drilling Co.
Date drilled: 1940
Elevation of well: 10 feet above sea level

Hydrologic Information

Diameter of well: 6 inches to 4 inches
Static (nonpumping) water level: Unknown
Depth of well: 192 feet
Yield: 50 gallons a minute with an 11-foot drawdown.
Cased to: 187 feet
Finish: open end

Log of Well

Depth (feet)

Post-Miocene—surficial sands, clays and marls

0-15 No sample.

15-20 Sand and shell, tan; 60 percent medium to fine-grained rounded to subangular quartz sand. 35 percent shells and shell fragments. 5 percent tan silt and clay matrix. Frosted and pitted quartz grains predominant. No Ostracoda, Foraminifera common.

20-50 No sample.

Upper Miocene—Yorktown formation

50-70 Marl, gray; 55 percent fine to medium-grained angular to subrounded quartz sand. 25 percent broken shell fragments. 20 percent gray clay matrix, unconsolidated. Small black phosphate grains and shards, prominent. Ostracoda and Foraminifera rare.

70-80 Marl, gray to green; Same as 50-70-foot interval with a slight increase in clay matrix. Ostracoda and Foraminifera rare.

80-120 Sandy limestone, light-gray; 25 percent medium to fine-grained subangular to angular quartz sand. 15 percent coarse broken shell fragments. 60 percent calcareous matrix, well consolidated and very hard. Black rounded phosphate grains prominent. No microfossils

120-150 Marl, dark-gray; 40 percent fine to medium-grained subangular quartz sand. 20 percent fine broken shell fragments. 40 percent blue-gray clay matrix, unconsolidated but compact. Ostracoda very rare, Foraminifera common.

150-152 Phosphatic sand, gray; 60 percent very coarse to fine-grained rounded to angular quartz sand. 30 percent black coarse-grained phosphatic pebbles. 10 percent gray clay matrix, unconsolidated. Trace of broken shell fragments.

152-188 Sand and clay, brown; 30 percent very fine to fine-grained angular quartz sand. 70 percent brown clay and silt matrix, unconsolidated. Trace of black very fine-grained collophane and broken shell fragments. Ostracoda and Foraminifera very rare.

188-192 Shell limestone, light-gray; 10 percent fine to medium-grained angular quartz sand. 70 percent coarse broken abraded shell fragments. 20 percent light-gray calcareous matrix, consolidated and moderately hard. Trace of black medium to fine-grained collophane. Ostracoda and Foraminifera very rare.

Ostracoda from the 50-192-foot intervals include:
Paracytheridea vandenboldi Puri
Leguminocythereis whitei Swain
Actinocythereis exanthemata (Ulrich and Bassler)
Orionina vaughani (Ulrich and Bassler)
Hemicythere schmidtae Malkin

Carteret County

Number 3

Location: F. L. Karsten, Laughton Number 1, Oil Test Well, Morehead City, North Carolina.
Owner: Coastal Plains Co.
Driller: Coastal Plains Co.
Date drilled: 1945
Elevation of well: 17 feet above sea level
Depth of test well: 4,044 feet

Hydrologic Information

The depth to strata containing water with excessive chlorides is believed to be about 600 feet in this well as based on an examination of the electric log. A partial log of the well is given for its lithologic value to water-well drillers.

Log of Well

Depth (feet)

Post-Miocene—surficial sands

0-47 Sand, tan; 85 percent fine-grained angular quartz sand. 15 percent tan clay matrix, unconsolidated. Trace of fine-grained ilmenite and mica flakes.

47-60 Sand, light-gray; Same as 0-47-foot interval with color change and trace of broken shell fragments.

Upper Miocene—Yorktown formation

60-80 Marl, gray; 40 percent medium to fine-grained subangular to angular quartz sand. 25 percent broken shell fragments. 25 percent blue-gray clay matrix, unconsolidated. 10 percent black fine-grained phosphate.

80-100 No sample.

100-140 Sand, gray; 65 percent coarse to fine-grained subrounded to angular quartz sand. 25 percent gray calcareous clay matrix, unconsolidated. 10 percent broken partially recrystallized shell and dolomite fragments. Black medium to fine-grained collophane prominent.

140-170 No sample.

170-305 Shell and sand, light-gray to white; 25 percent fine-grained

angular quartz sand. 55 percent coarse partially-recrystallized shell and dolomite fragments. 20 percent gray calcareous clay matrix, unconsolidated to hard in streaks. Black collophane grains prominent.

305-330 Sand, gray; 60 percent medium to fine-grained subrounded to subangular quartz sand. 25 percent gray calcareous clay matrix, indurated and moderately consolidated. 15 percent coarse broken shell and dolomite fragments.

Upper(?) *Eocene*—upper part of Castle Hayne limestone

330-594 Sandy, dolomitic, shell limestone; light-gray; 25 percent fine to medium-grained subangular quartz sand. 45 percent partially recrystallized dolomite and limestone fragments. 30 percent gray calcareous matrix, indurated and well consolidated. Black collophane grains prominent.

Middle(?) *Eocene*—lower part of Castle Hayne limestone

594-1027 Sandy, dolomitic, shell limestone, white; 40 percent medium to fine-grained subrounded to subangular quartz sand. 35 percent broken recrystallized dolomite and shell fragments. 25 percent white calcareous matrix, indurated and well consolidated but very porous. Trace of black fine-grained collophane. Quartz sand component increases to about 55 percent below 870 feet.

Lower Eocene and Paleocene (?)—unnamed units

1027-1120 Shell limestone, white to light-green; 20 percent fine to medium-grained angular to subangular quartz sand. 45 percent coarse to fine partially-recrystallized shell fragments. 30 percent white to green calcareous clay matrix, loosely consolidated to indurated in streaks. 5 percent light-green fine-grained glauconite.

Upper Cretaceous—Peedee formation

1120-1151 Calcareous sand, light-gray; 65 percent medium to fine-grained, subangular quartz sand. 30 percent gray calcareous clay matrix, indurated and moderately consolidated. 5 percent coarse broken shell fragments. Trace of dark-green glauconite and brown collophane spherules.

Remarks: The samples from this well, available to the writer, were very small and contained very few Ostracoda. Correlation to 1120 feet is based on lithology and unpublished reports of several paleontologists with adjustments made to conform to present stratigraphic usage. The top of the Peedee is picked on the highest occurrence of *Brachycythere rhomboidalis* (Berry) and *Globotruncana cretacea* Cushman in the 1120-1151-foot sample interval. For correlations based on examination of the entire suite of samples the reader is referred to Dr. F. M. Swain's "Ostracoda from Wells in North Carolina," U. S. Geological Survey Professional Papers 234-A and 234-B, (1951, 1952).

Carteret County

Number 4

Location: Bogue, North Carolina, U. S. Marine Auxillary Air Base.
Owner: U. S. Navy
Driller: Heater Well Co.
Date drilled: 1941
Elevation of well: 18.5 feet above sea level

Hydrologic Information

Diameter of well: 8 inches
Static (nonpumping) water level: 12 feet below land surface (1941)
Depth of well: 260 feet
Yield: 225 gallons a minute with an 18.7 foot drawdown
Cased to: 207 feet
Finish: slotted casing

Log of Well

Depth (feet)

0-30 No sample.

Post-Miocene—surficial marl and sand

30-45 Marl, dark-brown; 45 percent medium to fine-grained subrounded to subangular quartz sand. 25 percent broken shell fragments. 30 percent dark-brown clay and silt matrix, unconsolidated. No microfossils.

45-53 No sample.

53-93 Sand, gray; 75 percent medium to fine-grained rounded to subrounded quartz sand. 20 percent gray calcareous clay matrix, loosely consolidated. 5 percent coarse broken abraded shell fragments. Black coarse-grained collophane prominent. No Ostracoda, Foraminifera very rare.

Upper Miocene—Yorktown formation

93-150 Marl, light-gray; 30 percent medium to fine-grained subrounded to angular quartz sand. 55 percent coarse broken shell fragments. 15 percent white calcareous matrix, loosely consolidated. Ostracoda and Foraminifera very rare.

150-175 Calcareous sand, light-gray; 60 percent coarse to fine-grained subrounded to subangular quartz sand. 30 percent gray calcareous matrix, indurated and moderately consolidated. 10 percent coarse broken shell and limestone fragments. No Ostracoda, Foraminifera very rare.

175-205 Sand, light-gray; 70 percent medium to fine-grained subrounded to subangular quartz sand. 20 percent gray clay matrix, unconsolidated. 10 percent broken shell and limestone fragments. No Ostracoda, Foraminifera very rare.

Eocene— Castle Hayne limestone

205-230 Sandy limestone, gray; 35 percent medium to fine-grained subangular to angular quartz sand. 55 percent gray calcareous matrix, indurated and moderately hard. 10 percent broken partially-recrystallized limestone fragments. No Ostracoda, Foraminifera rare.

230-245 Sandy limestone, gray; Same as 205-230-foot interval with a slight increase in quartz sand. Ostracoda and Foraminifera rare.

Remarks: Ostracoda and Foraminifera were very rare in the samples examined. The samples themselves were very small, which probably accounts for the poor recovery. Samples from nearby wells were found to contain an abundant fauna. The top of the Yorktown formation is placed in the 93-150-foot interval on the basis of *Hemicythere conradi* Howe and McGuirt and *Cushmanidea ashermani* (Ulrich and Bassler). The Eocene ostracods, *Cytherctta alexandcri* Howe and Chambers and *Trachyleberis* sp. *B.*, were recovered from the 230-245-foot interval. The top of the Eocene is placed at 205-feet on the basis of its lithologic similarity to the 230-245-foot interval.

Chowan County

Number 1

Location: Test well at Edenton Naval Air Base, 4 miles east of Edenton, North Carolina.
Owner: U. S. Navy
Date drilled: 1943
Driller: Heater Well Co.
Elevation of well: 14.8 feet above sea level

Hydrologic Information

Diameter of well: 6 inches
Depth of well: 420 feet
Cased to: 420 feet
Static (nonpumping) water level: Unknown
Yield: Unknown
Finish: Abandoned due to poor yield and excessive chloride below 180 feet.

Log of Well

Depth (feet)

Post-Miocene—surficial sands and clays

0-10 Sand and clay, gray; 60 percent fine-grained angular quartz sand. 40 percent gray clay matrix, unconsolidated. Trace of fine-grained ilmenite. No microfossils.

20-30 Sand, gray; 85 percent medium-grained subrounded well-sorted quartz sand. 15 percent gray clay matrix, unconsolidated. No Ostracoda, Foraminifera very rare.

30-36 Sand, white; 95 percent medium to fine-grained subangular quartz sand. 5 percent tan clay matrix, unconsolidated. No Ostracoda, Foraminifera very rare.

36-45 Sand, gray; 80 percent medium to fine-grained subrounded to subangular quartz sand. 20 percent gray clay matrix, unconsolidated. No Ostracoda, Foraminifera very rare.

Upper Miocene—Yorktown formation

45-60 Marl, gray; 55 percent medium to fine-grained subangular quartz sand. 25 percent coarse broken abraded shall fragments. 20 percent blue-gray clay matrix, unconsolidated but compact. Ostracoda common, Foraminifera abundant.

60-72 Marl, gray; 45 percent fine-grained angular quartz sand. 20 percent fine broken shell fragments. 35 percent blue-gray clay matrix, unconsolidated but compact. Ostracoda common, Foraminifera abundant.

72-80 Marl, gray; 30 percent medium-grained subangular quartz sand. 50 percent coarse broken abraded shell fragments. 20 percent blue-gray clay matrix, unconsolidated. Ostracoda common, Foraminifera abundant.

80-90 Marl, gray; 60 percent medium to fine-grained subrounded quartz sand. 10 percent fine broken shell fragments. 30 percent blue-gray clay matrix, unconsolidated. Ostracoda and Foraminifera common.

90-100 Marl, gray; Same as 80-90-foot interval. Ostracoda and Foraminifera abundant.

100-110 Marl, gray; Same as 80-90-foot interval. Ostracoda and Foraminifera abundant.

110-120 Marl, gray; Same as 80-90-foot interval, with a slight increase in percentage occurrence of clay. Ostracoda and Foraminifera abundant.

120-140 Marl, gray; Same as 110-120-foot interval. Ostracoda and Foramminifera abundant.

150-170 Marl, gray; 20 percent very fine-grained angular quartz sand. 15 percent fine broken shell fragments. 65 percent blue-gray clay matrix, unconsolidated. Ostracoda and Foraminifera abundant.

170-180 Clay, gray; 10 percent fine to very fine-grained angular quartz sand. 90 percent blue-gray clay matrix, unconsolidated but very compact. Trace of broken shell fragments. Ostracoda and Foraminifera common.

180-200 Clay, gray; Same as 170-180-foot interval. Ostracoda and Foraminifera common.

200-220 Clay, gray; Same as 170-180-foot interval. Ostracoda and Foraminifera common.

220-240 Clay, gray; Same as 170-180-foot interval with a 10 percent increase in quartz sand. Ostracoda and Foraminifera common.

Ostracoda from the 45-220-foot intervals include:
Paracytheridea vandenboldi Puri
Murrayina martini (Ulrich and Bassler)
Orionina vaughani (Ulrich and Bassler)
Hemicythere coradi Howe and McGuirt
Hemicythere confragosa Edwards
Loxoconcha purisubrhomboidea Edwards
Cytheretta reticulata Edwards
Cushmanidea ashermani (Ulrich and Bassler)

Middle Miocene(?)—unnamed unit

240-245 Phosphatic sand, dark-brown; 20 percent fine to medium-grained, angular to subangular quartz sand. 35 percent medium-grained brown collophane spherules and shards. 45 percent dark-brown silt and clay matrix, unconsolidated. Trace of broken shell fragments. No Ostracoda, Foraminifera very rare.

245-255 Phosphatic sand, dark-brown; Same as 240-245-foot interval with a slight increase in shell content. No Ostracoda, Foraminifera very rare.

Middle Eocene(?)—Castle Hayne limestone(?)

255-270 Calcareous sand, gray; 60 percent medium-grained subangular to subrounded quartz sand. 40 percent gray shell limestone matrix, indurated and moderately consolidated. Dark-green medium-grained glauconite prominent. No Ostracoda, Foraminifera very rare.

270-280 Sandy limestone, white; 35 percent medium to fine-grained angular quartz sand. 65 percent white limestone matrix, indurated and moderately hard. Trace of dark-green fine-grained glauconite. No Ostracoda, Foraminifera very rare.

280-290 Sandy limestone, white; Same as 270-280-foot interval, but very hard. No microfossils.

290-310 Sand, white; 95 percent coarse to medium-grained subangular to subrounded quartz sand. 5 percent white calcareous clay matrix, unconsolidated. No Ostracoda, Foraminifera very rare.

Paleocene—unnamed unit

310-320 Sand and clay; light-gray; 45 percent fine to medium-grained angular quartz sand. 40 percent gray clay matrix, unconsolidated. 15 percent dark-green fine-grained glauconite and coarse mica flakes. Ostracoda and Foraminifera common.

320-340 Sand and clay, light-gray; Same as 310-320-foot interval. Ostracoda and Foraminifera common.

340-360 Clay and sand, gray; 30 percent medium-grained subrounded water-polished quartz sand. 60 percent gray micaceous clay matrix, unconsolidated but very compact. 10 percent dark-green medium to coarse-grained glauconite. Ostracoda and Foraminifera common.

360-370 Clay and sand, gray; Same as 340-360-foot interval. Ostracoda and Foraminifera common.

370-380 Glauconitic sand, "salt and pepper"; 45 percent fine to medium-grained angular quartz sand. 30 percent dark-green medium-grained glauconite. 25 percent gray calcareous clay matrix, indurated and loosely consolidated. Trace of authigenic pyrite aggregates. Ostracoda and Foraminifera rare.

380-400 Glauconitic sand and clay, light-green; 40 percent medium to coarse-grained subrounded quartz sand. 30 percent dark-green medium-grained glauconite. 30 percent green clay matrix, unconsolidated. Ostracoda and Foraminifera rare.

400-420 Glauconitic sand and clay, light-green; Same as 380-400-foot interval. Ostracoda and Foraminifera rare.

Ostracoda from the 310-400-foot intervals include:
Cytheridea (Haplocytheridea) hopkinsi Howe and Garrett
Cytheridea (Haplocytheridea) moodyi Howe and Garrett
Cytheridea (Clithrocytheridea) virginica (Schmidt)
Cytherura sp. aff. *C. oxycruris* Munsey
Brachycythere interrasilis Alexander
Brachycythere formosa Alexander
Trachyleberis prestwichiana (Jones and Sherborn)
Trachyleberis bassleri (Ulrich)
Cytheromorpha sp. aff. *C. scrobiculata* Alexander

Remarks: No Ostracoda were recovered from the interval designated as middle Miocene(?) or middle Eocene(?). Correlation is based on lithologic similarity to middle Miocene(?) and middle Eocene(?) strata in nearby wells. The interval designated as Paleocene carries an ostracode faunule having many lower Eocene forms and is regarded by the writer as somewhat younger than other Paleocene units recognized in this study. The top of the Paleocene unit is marked by the first occurrence of *Brachycythere interrasilis* Alexander.

Columbus County

Number 1

Location: City of Whiteville
Owner: City of Whiteville
Date drilled: 1951
Driller: Virginia Machine Co.
Elevation of well: 59 feet above sea level

Hydrologic Information

Diameter of well: 8 inches to 6 inches
Depth of well: 260 feet
Static (nonpumping) water level: 23 feet below land surface (1951)
Yield: 515 gallons a minute with a pumping level of 110 feet
Cased to: 260 feet
Finish: screens

Log of Well

Depth (feet)

Post-Miocene—surficial clay and sand

0-10 Clay and sand, light-tan; 30 percent fine-grained angular quartz sand. 70 percent mottled-white to tan clay matrix, unconsolidated but compact. Red hematite aggregates prominent. Trace of fine mica flakes. No microfossils.

10-20 Clay, light-gray; 5 percent very fine-grained angular quartz sand. 95 percent gray clay matrix, unconsolidated but very tight and compact. No microfossils.

Upper Cretaceous—Peedee formation

20-30 Sand and clay, dark-gray; 70 percent medium to fine-grained subangular to angular quartz sand. 30 percent gray clay matrix, unconsolidated but compact. Trace of fine mica flakes and light-green glauconite. Trace of fine broken shell fragments. Ostracoda rare, Foraminifera common.

30-40 Sand and clay, dark-gray; Same as 20-30-foot interval. Ostracoda very rare, Foraminifera common.

40-50 Sand and clay, dark-gray; Same as 20-30-foot interval with slight increase in percentage occurrence of clay. No Ostracoda, Foraminifera very rare.

50-60 Sand and clay, dark-gray; 60 percent fine to medium-grained angular quartz sand. 40 percent gray micaceous clay matrix,

uneonsolidated but very compact. Trace of dark-green glauconite and broken shell fragments. Ostracoda and Foraminifera rare.

60-70 Sand and elay; dark-gray; Same as 50-60-foot interval with broken, abraded shell fragments prominent. No Ostracoda, Foraminifera rare.

70-80 Sand and clay, dark-gray; Same as 60-70-foot interval. Ostracoda and Foraminifera very rare.

80-90 Sand and clay, dark-gray; Same as 60-70-foot interval. Ostracoda and Foraminifera very rare.

90-100 Clay, dark-gray; 15 percent medium to fine-grained angular quartz sand. 85 percent gray clay matrix, unconsolidated but very compact. Trace of coarse broken shell fragments. No Ostraeoda, Foraminifera very rare.

100-110 Clay, dark-gray; Same as 90-100-foot interval. No Ostracoda, Foraminifera very rare.

110-120 Sand and elay, dark-gray; 75 percent fine to medium-grained angular to subangular quartz sand. 25 percent gray micaceous clay matrix, unconsolidated. Dark-green fine-grained glauconite prominent. Trace of broken shell fragments. Ostracoda and Foraminifera very rare.

120-130 Sand, white; 95 percent very eoarse to medium-grained subangular quartz sand. 5 percent gray clay matrix, unconsolidated. Trace of marcasite aggregates. No microfossils.

130-140 Clay and sand, dark-gray; 35 percent very fine to fine-grained angular quartz sand. 65 percent gray micaceous clay matrix, unconsolidated but compact. Dark-green glauconite prominent. Trace of coarse broken abraded shell fragments. No Ostracoda, Foraminifera very rare.

140-150 Sand, light-gray; 90 percent very coarse to medium-grained subrounded to subangular quartz sand. 10 percent gray clay matrix, unconsolidated. Ostracoda and Foraminifera very rare.

150-160 Sand and clay, dark-gray; 70 percent medium to fine-grained subangular to angular quartz sand. 30 percent gray micaceous clay matrix, unconsolidated but compact. Ostracoda and Foraminifera very rare.

Ostracoda occurring in the 20-150-foot intervals include:
Cytherella ovata (Roemer)
Cytherelloidea(?) *euneiforma Brown*
Cytheridea (Haploeytheridea) earolinensis Brown
Cytheridea (Haploeytheridea) ulrichi (Berry)
Trachyleberis gapensis (Alexander)
Loxoconcha seraphae Brown

Upper Cretaceous—Peedee formation(?)

160-170 Clay, black; 20 percent fine-grained angular quartz sand. 80 percent black micaceous elay matrix, unconsolidated but very compact. Trace of pyrite aggregates and black lignitized wood and plant fragments. No Ostracoda, dwarf Foraminifera very rare.

170-180 Clay, black; Same as 160-170-foot interval. No Ostracoda, dwarf Foraminifera very rare.

180-190 Sand, gray; 90 percent coarse to medium-grained subrounded quartz sand. 10 percent gray clay matrix, unconsolidated. Trace of black lignitized wood and plant fragments and marcasite aggregates. No microfossils.

190-200 Clay, black; 10 percent very fine-grained angular quartz sand. 90 pereent black micaceous clay matrix, unconsolidated but very compact. Black lignitized wood and plant fragments prominent. No Ostracoda, Foraminifera very rare.

200-210 Sand and clay, dark-gray; 75 percent medium to fine-grained subangular to angular quartz sand. 25 percent gray micaceous clay matrix, unconsolidated. Light-green glauconite prominent. Trace of broken abraded shell fragments. No Ostracoda, Foraminifera very rare.

210-220 Sand and clay, dark-gray; 65 percent coarse to fine-grained subangular to angular quartz sand. 30 percent gray micaceous clay matrix, unconsolidated but compact. 5 percent coarse broken abraded shell fragments. Black lignitized wood and plant fragments prominent. Trace of light-green glauconite. No microfossils.

220-230 Sand and clay, dark-gray; Same as 210-220-foot interval. No Ostracoda, dwarf Foraminifera very rare.

230-240 Sand, dark-gray; 80 percent fine to medium-grained angular quartz sand. 20 percent gray micaceous clay matrix, unconsolidated. Light-green glauconite prominent. Trace of fine broken shell fragments. No microfossils.

240-250 Clay, blaek; 10 percent fine-grained angular quartz sand. 90 percent black micaceous clay matrix, unconsolidated but very compact. Black lignitized wood and plant fragments prominent. Trace of dark-green glauconite and marcasite aggregates. No Ostracoda, dwarf Foraminifera very rare.

250-260 Sand, gray; 80 percent medium to fine-grained subangular to angular quartz sand. 15 percent gray clay matrix, unconsolidated. 5 percent light to dark-green glauconite. Trace of broken shell fragments. No microfossils.

Remarks: No Ostracoda were recovered from the sample intervals below 160 feet. Foraminifera below 160 feet are represented by a dwarf biofacies although there is no apparent lithologic break at 160 feet. The interval below 160 feet is provisionally included in the Peedee formation in the absence of faunal evidence indicating the Black Creek formation.

Craven County

Number 1

Location: At the John Moore farm on U. S. Route 70, 1 mile north of Pine Grove, North Carolina.
Owner: John Moore
Date drilled: 1952
Driller: Bennett Well Co.
Elevation of well: 24 feet above sea level

Hydrologic Information

Diameter of well: 1½ inches
Depth of well: 70 feet
Cased to: 70 feet
Finish: open end
Statie (nonpumping) water level: Unknown
Yield: Unknown

Log of Well

Depth (feet)

Post-Miocene—undifferentiated

0-10 Sand and clay, gray; 65 percent fine-grained subangular quartz sand. 35 percent gray clay matrix, unconsolidated. No microfossils.

20-30 Sand and clay, tan; 55 percent medium-grained subrounded quartz sand. 45 percent tan clay and silt matrix, unconsolidated. Limonitic staining of quartz grains predominant. No microfossils.

30-40 Sand, gray; 85 percent medium to coarse-grained subrounded to rounded quartz sand. 10 percent gray clay matrix, unconsolidated. 5 percent fine broken shell fragments. Trace of light-green fine-grained glauconite. No microfossils.

40-50 Sand, gray; Same as 30-40-foot interval. No microfossils.

50-60 Marl, gray; 45 percent fine to medium-grained subangular to subrounded quartz sand. 30 percent coarse broken and abraded shell fragments. 25 percent gray clay matrix, unconsolidated. No Ostracoda, Foraminifera rare.

60-70 Marl, gray; Same as 50-60-foot interval. No Ostracoda, Foraminifera rare.

70 Marl, gray; Same as 50-60-foot interval but loosely consolidated. Ostracoda rare, Foraminifera common.

Remarks: Owing to partial recrystallization and poor preservation, Ostracoda from this well were not identified. The Foraminifera, predominantly species of *Elphidum*, are similar to those forms occurring in the post-Miocene in other nearby wells. The entire section penetrated in this well is considered to be undifferentiated post-Miocene on the basis of the highest occurrence of upper Miocene Ostracoda in several nearby wells.

Craven County

Number 2

Location: On the Williams farm at Thurman, North Carolina, off U. S. Route 70, 3.4 miles north of Riverdale, North Carolina.
Owner: Red Williams
Date drilled: 1952
Driller: Bennett Well Co.
Elevation of well: 20 feet above sea level

Hydrologic Information

Diameter of well: 1½ inches
Depth of well: 81 feet
Cased to: 80 feet
Finish: open end
Static (Nonpumping) water level: Unknown
Yield: Unknown

Log of Well

Depth (feet)	
0-10	No sample.
	Post-Miocene—surficial marls and sands
10-20	Marl, gray; 25 percent fine-grained angular quartz sand. 30 percent coarse broken shell fragments. 45 percent gray clay matrix, unconsolidated. No microfossils.
20-30	Sand and clay, gray; 65 percent fine to very fine-grained angular quartz sand. 30 percent gray clay matrix, unconsolidated. 5 percent fine broken shell fragments. No microfossils.
30-40	Sand and clay; Same as 20-30-foot interval. No Ostracoda, Foraminifera very rare.
	Upper Miocene—Yorktown formation
40-50	Marl, gray; 25 percent fine to medium-grained subangular quartz sand. 45 percent coarse broken shell fragments. 30 percent blue-gray clay matrix, unconsolidated. Ostracoda rare, Foraminifera common.
50-60	Marl, gray; Same as 40-50-foot interval. Ostracoda rare, Foraminifera common.
60-70	Marl, brown; 30 percent fine-grained angular to subangular quartz sand. 25 percent fine broken shell fragments and reworked recrystallized-limestone fragments. 45 percent brown silt and clay matrix, unconsolidated. Ostracoda and Foraminifera common.
70-80	Sandy, dolomitic limestone, light-gray; 25 percent fine to medium-grained subrounded to subangular quartz sand. 75 percent recrystallized dolomitic limestone in a calcareous matrix, well consolidated and hard. Ostracoda and Foraminifera common.
80-81	Sandy, dolomitic limestone, light-gray; Same as 70-80-foot interval. Ostracoda and Foraminifera rare.

Ostracoda from 40 to 81-feet include:
Actinocythereis exanthemata (Ulrich and Bassler)
Echinocythereis garretti (Howe and McGuirt)
Puriana rugipunctata (Ulrich and Bassler)
Orionina vaughani (Ulrich and Bassler)
Hemicythere confragosa Edwards
Loxoconcha purisubrhomboidea Edwards

Craven County

Number 3

Location: Test well number 10 at city of New Bern water plant.
Owner: City of New Bern
Date drilled: 1953
Driller: Heater Well Co.
Elevation of well: 12 feet above sea level

Hydrologic Information

Diameter of well: 10 inches
Depth of well: 125 feet
Cased to 40 feet
Static (nonpumping) water level: 22 feet below land surface (1953)
Yield: 300 gallons a minute with a 9-foot drawdown
Finish: gravel wall and screens
Chemical analysis of water available

Log of Well

Depth (feet)	
	Post-Miocene—surficial sands and clays
0-8	Sand, gray; 90 percent coarse to fine-grained subrounded to angular quartz sand. 10 percent gray silt and clay matrix, unconsolidated. No microfossils.
8-20	Clay and sand, gray; 25 percent fine to very fine-grained angular quartz sand. 75 percent gray clay matrix, unconsolidated but tight. Very fine-grained mica flakes prominent. No microfossils.
	Upper Miocene—Yorktown formation
20-27	Marl, gray; 30 percent medium to fine-grained subrounded to subangular quartz sand. 45 percent very-coarse broken abraded shell fragments. 25 percent gray calcareous matrix, partially siliceous and moderately hard. Medium-grained black collophane spherules prominent. Partially-recrystallized Ostracoda and Foraminifera rare.

Ostracoda occurring in the 20-27-foot interval include:
Cytherura elongata Edwards
Hemicythere confragosa Edwards
Loxoconcha purisubrhomboidea Edwards

	Upper (?) Eocene—upper part of Castle Hayne limestone
27-41	Sandy, dolomitic, shell limestone, light-gray; 25 percent fine to medium-grained angular to subangular quartz sand. 75 percent gray recrystallized dolomitic shell fragments and calcareous matrix, well consolidated and very porous. Ostracoda and Foraminifera common but generally recrystallized.
41-52	Sandy, dolomitic, shell limestone, light-gray; Same as 27-41-foot interval. Ostracoda and Foraminifera common, recrystallized.
52-61	Sandy, dolomitic, shell limestone, light-gray; Same as 27-41-foot interval. Ostracoda and Foraminifera rare, recrystallized.
61-71	Sandy, dolomitic, shell limestone, light-gray; Same as 27-41-foot interval, but slightly harder. Ostracoda and Foraminifera rare, recrystallized.
71-81	Sandy, dolomitic, shell limestone, light-gray; Same as 61-71-foot interval. Ostracoda and Foraminifera very rare, recrystallized.
81-92	Sandy, dolomitic, shell limestone, light-gray; Same as 61-71-foot interval. Ostracoda and Foraminifera very rare, recrystallized.
92-101	Sandy, dolomitic, shell limestone, light-gray; Same as 61-71-foot interval. Ostracoda and Foraminifera very rare, recrystallized.

Ostracoda occurring in the 20-101-foot interval include:
Paracypris franquesi Howe and Chambers
Cytheridea (Clithrocytheridea) caldwellensis Howe and Chambers
Paracytheridea belhavenensis Howe and Chambers
Brachycythere watervalleyensis Howe and Chambers
Actinocythereis davidwhitei (Stadnichenko)
Loxoconcha claibornensis Murray
Cytheretta alexanderi Howe and Chambers

	Middle Eocene—lower part of Castle Hayne limestone
101-111	Calcareous sand, light-gray; 65 percent fine to very fine-grained angular water-polished quartz sand. 35 percent white partially-recrystallized shell fragments and calcareous matrix, siliceous and hard. Dark-green very fine-grained glauconite prominent. Ostracoda and Foraminifera common, partially-recrystallized.
111-125	Calcareous sand, light-gray; Same as 101-111-foot interval, but only partially-indurated and loosely consolidated. Ostracoda and Foraminifera common.

Ostracoda from 101-125-foot interval include:
Cythella sp. B.
Brachycythere watervalleyensis Howe and Chambers
Trachyleberis pellucinoda (Swain)
Trachyleberis rukasi (Gooch)
Actinocythereis davidwhitei (Stadnichenko)
Cytheretta alexanderi Howe and Chambers

Remarks: Division of the Castle Hayne limestone into its upper and middle Eocene components in this area is very difficult. The absence of the characteristic middle Eocene ostracodes, *Trachyleberis pellucinoda* (Swain) and *Trachyleberis rukasi* (Gooch), above 101 feet and the presence above 101 feet of *Paracytheridea belhavenensis* Howe and Chambers, together with a distinct lithologic break at 101 feet indicates to the writer that the division of the Castle Hayne limestone into its upper and middle Eocene components occurs in this well at 101 feet.

Craven County

Number 4

Location: Test well at the W. C. Parker farm on U. S. Route 70, 0.7 mile northwest of the junction of N. C. Route 55 and U. S. Route 70.
Owner: W. C. Parker
Date drilled: 1952
Driller: Bennett Well Co.
Elevation of well: 25 feet above sea level

Hydrologic Information

No hydrologic information is available concerning this test well.

Log of Well

Depth (feet)	
	Post-Miocene—surficial sand
0-10	Sand, yellow; 85 percent coarse to fine-grained subrounded to angular poorly-sorted quartz sand. 15 percent yellow clay matrix,

unconsolidated. Limonitic staining of quartz grains prominent. No microfossils.

Upper(?) Eocene—upper part of Castle Hayne limestone

20-30 Calcareous sand, light-gray; 65 percent fine-grained angular quartz sand. 30 percent calcareous matrix, indurated. 5 percent coarse broken shell fragments. Very fine-grained glauconite prominent. Trace of black collophane pebbles. Ostracoda and Foraminifera rare.

30-40 Calcareous sand, light-gray; Same as 20-30-foot interval. Slight increase in shell content. Ostracoda and Foraminifera rare.

40-50 Calcareous sand, light-gray; Same as 20-30-foot interval. Ostracoda and Foraminifera rare.

Ostracoda from the 20-40-foot intervals include:
Cytherelloidea danvillensis Howe var.
Brachycythere watervalleyensis Howe and Chambers
Loxoconcha jacksonensis Howe and Chambers
Monoceratina alexanderi Howe and Chambers

Middle Eocene—lower part of Castle Hayne limestone

50-67 Marl, gray; 25 percent fine-grained subangular quartz sand. 35 percent broken shell and limestone fragments. 40 percent calcareous matrix, indurated and loosely consolidated. Ostracoda and Foraminifera rare.

90-95 Marl, gray; Same as 50-67-foot interval.

116-135 Marl, gray; Same as 50-67-foot interval but slightly harder. Ostracoda and Foraminifera rare.

135-168 Sand, gray; 70 percent medium to fine-grained subangular to angular quartz sand. 20 percent calcareous matrix, indurated and loosely consolidated. 10 percent broken shell and limestone fragments. Ostracoda rare, Foraminifera common.

Ostracoda from the 50-168-foot intervals include:
Cytheridea (Haplocytheridea) montgomeryensis Howe and Chambers
Cytheridea (Clithrocytheridea) virginica (Schmidt)
Trachyleberis rukasi (Gooch)
Trachyleberis bassleri (Ulrich)
Actinocythereis hilgardi (Howe and Garrett)
Loxoconcha creolensis Howe and Chambers

Lower Eocene—unnamed unit

168-180 Glauconitic sand, "salt and pepper", 55 percent coarse to medium-grained subrounded to angular quartz sand. 30 percent dark-green medium-grained glauconite. 15 percent gray to green clay matrix, unconsolidated. Ostracoda and Foraminifera common.

Ostracoda present in the 168-180-foot interval include:
Cytheridea (Clithrocytheridea) virginica (Schmidt)
Brachycythere marylandica (Ulrich)
Trachyleberis bassleri (Ulrich)
Trachyleberis communis aquia (Schmidt)
Actinocythereis hilgardi (Howe and Garrett)

Craven County

Number 5

Location: On an unnumbered dirt road, 2 miles northwest of Cove City and 1 mile south of U. S. Route 70.
Owner: Carlton Ward
Date drilled: 1952
Driller: Bennett Well Co.
Elevation of well: 46 feet above sea level

Hydrologic Information

Diameter of well: 1½ inches
Depth of well: 180 feet
Cased to: 180 feet
Finish: open end
Static (nonpumping) water level: Unknown
Yield: Unknown

Log of Well

Depth (feet)

0-20 No sample

Upper(?) Eocene—upper part of Castle Hayne limestone

20-30 Sand, gray; 75 percent fine to very fine-grained angular quartz sand. 15 percent gray calcareous clay matrix, unconsolidated. 10 percent fine broken calcareous fragments. Trace of dark-green fine-grained glauconite. Ostracoda and Foraminifera common.

30-40 Sand, gray; Same as 20-30-foot interval.

Ostracoda from 20-40-feet include:
Alatacythere ivani Howe
Brachycythere watervalleyensis Howe and Chambers
Loxoconcha jacksonensis Howe and Chambers
Cythercetta alexanderi Howe and Chambers

Middle Eocene—lower part of Castle Hayne limestone

60-80 Sand, gray; 60 percent medium to very fine-grained angular poorly-sorted quartz sand. 25 percent gray calcareous matrix, loosely consolidated. 15 percent cream-colored broken calcareous shell fragments, partially recrystallized. Medium-grained glauconite prominent.

80-120 Sand, gray; Same as 60-80-foot interval.

Ostracoda from 60-120-feet include:
Cytheridea (Clithrocytheridea) virginica (Schmidt)
Trachyleberis rukasi (Gooch)
Actinocythereis hilgardi (Howe and Garrett)
Actinocythereis stenzeli (Stephenson)

Upper Cretaceous—Peedee formation

130-140 Sand, gray; 65 percent medium to fine-grained subangular quartz sand. 25 percent gray silt and clay matrix, unconsolidated. 10 percent gray broken and abraded shell fragments. Blue quartz grains prominent. Trace of dark-green glauconite.

170-180 Calcareous sand, gray; 60 percent medium to fine-grained subangular quartz sand. 25 percent gray calcareous clay matrix, moderately indurated. 15 percent gray broken and abraded shell fragments.

Ostracoda from 130-180-feet include:
Eucytherura curta (Jennings)
Brachycythere rhomboidalis (Berry)
Trachyleberis pidgeoni (Berry)
Velarocythere eikonata Brown
Velarocythere scuffeltonensis Brown

Remarks: Both Jackson(?) and Claiborne elements of the Castle Hayne limestone are present in this set of samples.

Craven County

Number 6

Location: Dover High School, Dover, North Carolina.
Owner: Dover School
Date drilled: 1952
Driller: A. L. Lufton
Elevation of well: 63 feet above sea level

Hydrologic Information

Diameter of well: 4 inches
Depth of well: 194 feet
Cased to: 194 feet
Finish: open end
Static (nonpumping) water level: Unknown
Yield: Unknown
Chemical analysis of water available

Log of Well

Depth (feet)

0-20 No sample

Lower Eocene—unnamed unit

20-40 Sandy, shell limestone, white; 25 percent fine to medium-grained, subangular to subrounded quartz sand. 65 percent white shell fragments and calcareous matrix, indurated and hackly. 10 percent dark-green medium-grained glauconite. Trace of medium-grained black collophane. Ostracoda and Foraminifera common.

40-50 Sandy, shell limestone, white; Same as 20-40-foot interval with 10 percent increase in quartz sand. Ostracoda and Foraminifera common.

50-60 Calcareous sand, green; 50 percent coarse to medium-grained subrounded to subangular quartz sand. 25 percent broken shell and limestone fragments. 15 percent green calcareous clay matrix. loosely consolidated. 10 percent dark-green coarse to medium-grained glauconite. Trace of medium-grained black collophane. Ostracoda and Foraminifera common.

Ostracoda occurring in the 20-60-foot interval include:
Cytherelloidea howei Swain

Paracypris cf. *P. strecca* Schmidt
Cytheridea (Clithrocytheridea) virginica (Schmidt)
Brachycythere marylandica (Ulrich)
Brachycythere jessupensis Howe and Garrett
Trachyleberis bassleri (Ulrich)
Trachyleberis communis aquia (Schmidt)
Actinocythereis hilgardi (Howe and Garrett)

Upper Cretaceous—Pcedee formation

60-70 Clay and sand, gray; 45 percent medium to fine-grained subangular to angular quartz sand. 55 percent gray calcareous clay matrix, unconsolidated. Trace of dark-green medium-grained glauconite. Ostracoda and Foraminifera abundant.

70-80 Marl, gray; 40 percent fine to medium-grained subangular quartz sand. 30 percent broken abraded shell and limestone fragments. 30 percent gray clay matrix, unconsolidated. Trace of dark-green medium-grained glauconite. Ostracoda and Foraminifera abundant.

80-90 Clay and sand, gray; 40 percent fine to very fine-grained angular quartz sand. 60 percent gray calcareous clay matrix, unconsolidated. Trace of broken shell fragments and dark-green fine-grained glauconite. Ostracoda and Foraminifera common.

116-126 Sand, gray; 95 percent medium-grained subangular quartz sand. 5 percent gray clay matrix, unconsolidated. Trace of light-green medium-grained glauconite and broken shell fragments. Ostracoda and Foraminifera abundant.

126-137 Sand, gray; Same as 116-126-foot interval. Ostracoda and Foraminifera abundant.

137-147 Sand, gray; Same as 116-126-foot interval with 30 percent of quartz grains iron stained. Ostracoda and Foraminifera abundant.

147-157 Sand and clay, gray; 60 percent fine to medium grained angular to subangular quartz sand. 35 percent gray clay matrix, unconsolidated 5 percent dark-green fine-grained glauconite Trace of broken abraded shell fragments. Ostracoda and Foraminifera abundant.

157-168 Sand and clay, gray; Same as 147-157-foot interval. Ostracoda and Foraminifera common.

168-179 Sand, gray; 80 percent very coarse to fine-grained subangular to angular poorly-sorted quartz sand. 15 percent gray clay matrix, unconsolidated. 5 percent dark-green fine to medium-grained glauconite. Broken abraded shell fragments prominent. Ostracoda and Foraminifera common.

179-189 Sand, gray; Same as 168-179-foot interval. Ostracoda and Foraminifera abundant.

189-194 Sand, gray; Same as 168-179-foot interval. Ostracoda and Foraminifera abundant.

Ostracoda from the 60-194-foot interval include:
Cytheridea (Haplocytheridea) ulrichi (Berry)
Brachycythere rhomboidalis (Berry)
Trachyleberis communis (Israelsky)
Trachyleberis pidgeoni (Berry)
Velarocythere arachoides (Berry)

Craven County

Number 7

Location: 3.5 miles north of Vanceboro on U. S. Route 17.
Owner: J. C. Lancaster, Jr.
Date drilled: 1955
Driller: Heater Well Co.
Elevation of well: 32 feet above sea level

Hydrologic Information

Diameter of well: 18 inches
Depth of well: 138 feet
Cased to: 138 feet
Finish: Gravel wall and screens (Irrigation well)
Static (nonpumping) water level: 12 feet below land surface (1955)
Yield: Tested at 500 gallons a minute with an 11-foot drawdown.

Log of Well

Depth (feet)

Post-Miocene—surficial sands

0-16 Clay, yellow; 20 percent fine to very fine-grained angular quartz sand. 80 percent yellow clay and silt matrix, unconsolidated. Fine-grained ilmenite prominent. No microfossils.

16-31 Sand and clay, gray; 45 percent fine-grained angular quartz sand. 55 percent gray micaceous clay and silt matrix. No microfossils.

31-57 Sand, gray; 85 percent coarse to medium-grained subrounded to subangular quartz sand. 15 percent gray clay matrix, unconsolidated.

57-67 Sand and silt, brown; 55 percent coarse-grained subrounded quartz sand. 20 percent white coarse-grained blocky potash feldspar. 25 percent brown silt matrix, unconsolidated. No microfossils.

Middle Eocene—lower part of Castle Hayne limestone

67-100 Marl, gray; 15 percent fine-grained subangular to subrounded quartz sand. 40 percent fine broken shell fragments. 35 percent gray calcareous clay matrix, loosely consolidated to chalky. 10 percent dark-green medium-grained glauconite. Ostracoda and Foraminifera common.

100-138 Marl, gray; 10 percent fine-grained subangular quartz sand. 65 percent broken abraded shell fragments, much coarser than above interval. 20 percent gray calcareous clay matrix, indurated. 5 percent dark-green fine to medium-grained glauconite. Ostracoda and Foraminifera common.

Ostracoda from 67-138-feet include:
Brachycythere cf. *B. bernardi* Murray and Hussey
Trachyleberis pellucinoda (Swain)
Trachyleberis rukasi (Gooch)
Actinocythereis hilgardi (Howe and Garrett)
Buntonia cf. *B. lacunosa* (Jones)

Craven County

Number 8

location: Well number 52 at Cherry Point Marine Base.
Owner: U. S. Navy
Date drilled: 1942
Driller: Heater Well Co.
Elevation of well: 24.2 feet above sea level

Hydrologic Information

Diameter of well: 8 inches
Depth of well: 370 feet
Cased to: 370 (?) feet
Finish: screens
Static (nonpumping) water level: 12 feet below land surface (1942)
Yield: Tested at 320 gallons a minute with a 2.6 foot drawdown (1942)

Log of Well

Depth (feet)

Post-Miocene—Pliocene(?) or younger

25-35 Marl, gray; 20 percent fine to medium-grained subangular quartz sand. 40 percent broken shell fragments. 40 percent gray silt and clay matrix, unconsolidated. Ostracoda rare, Foraminifera common.

35-40 Marl, gray; Same as 25-35-foot interval with 10 percent increase in sand content at expense of clay matrix. Ostracoda rare, Foraminifera common.

40-50 Sand, gray; 70 percent fine-grained angular quartz sand. 25 percent silt and clay matrix, unconsolidated. 5 percent black to brown phosphate fragments. Ostracoda rare, Foraminifera common.

55-64 Sand, gray; Same as 40-50-foot interval. Ostracoda rare, Foraminifera common.

Ostracoda from 25-64-feet include:
Paracytheridea sp. and *Cytherideis?* sp. which have been recognized only in post-Miocene material previously.

Upper Miocene—Yorktown formation

70-75 Calcareous sand, white; 75 percent coarse to medium-grained rounded to subrounded quartz sand. 25 percent calcareous matrix, hard and well cemented. Large black phosphate pebbles prominent. Ostracoda and Foraminifera rare.

85-90 Calcareous sand, gray; Same as 70-75-foot interval. Ostracoda and Foraminifera rare.

90-110 Calcareous sand, gray; Same as 70-75-foot interval. Ostracoda and Foraminifera very rare.

110-130 Calcareous sand, cream; 60 percent coarse to medium-grained subrounded quartz sand. 40 percent calcareous silt and clay matrix,

loosely consolidated. Less than 5 percent broken shell fragments. Ostracoda and Foraminifera very rare.

130-135 Calcareous sand, cream; Same as 110-130-foot interval with 10 percent increase in broken shell fragments. Ostracoda and Foraminifera rare.

135-140 Calcareous sand, cream; Same as 110-130-foot interval. Ostracoda and Foraminifera rare.

140-160 Marl, gray; 20 percent medium to fine-grained subrounded quartz sand. 35 percent broken abraded shell fragments. 45 percent calcareous silt and clay matrix, loosely consolidated. Ostracoda and Foraminifera common.

160-170 Marl, gray; 35 percent coarse to fine-grained subrounded to angular quartz sand. 25 percent broken shell fragments. 40 percent gray silt and clay matrix, unconsolidated. Ostracoda and Foraminifera common.

Ostracoda in the 55-170-foot intervals include:
Puriana rugipunctata (Ulrich and Bassler)
Actinocythereis exanthemata (Ulrich and Bassler)
Hemicythere confragosa Edwards
Hemicythere conradi Howe and McGuirt
Cushmanidea ashermani (Ulrich and Bassler)

Upper(?) Eocene—upper part of Castle Hayne limestone

170-180 Marl, cream; 15 percent medium to fine-grained subrounded to subangular quartz sand. 65 percent broken and abraded shell fragments. 20 percent calcareous clay matrix, loosely consolidated. Ostracoda and Foraminifera abundant.

180-190 Marl, cream; Same as 170-180-foot interval, but indurated. Ostracoda and Foraminifera rare.

190-195 Marl, cream; Same as 180-190-foot interval. Ostracoda and Foraminifera rare.

195-205 Marl, cream; Same as 180-190-foot interval. Ostracoda and Foraminifera rare.

205-210 Marl, gray; 25 percent medium to fine-grained subangular quartz sand. 30 percent broken shell fragments. 45 percent gray silt and clay matrix, loosely consolidated. Ostracoda and Foraminifera common.

210-220 Sandy, dolomitic limestone, gray; 15 percent medium to fine-grained subangular quartz sand. 85 percent dolomitic partially-recrystallized shell fragments in a calcareous and dolomitic matrix, hard and well cemented. Ostracoda and Foraminifera rare.

220-225 Sandy, dolomitic limestone; Same as 210-220-foot interval. Ostracoda and Foraminifera rare.

225-230 Sandy, dolomitic limestone, gray; 10 percent medium to fine-grained subangular quartz sand. 90 percent recrystallized dolomitic fragments in a calcareous matrix, very hard and well consolidated. Ostracoda and Foraminifera rare.

230-235 Sandy, dolomitic limestone, gray; Same as 225-230-foot interval. Ostracoda and Foraminifera rare.

235-250 Sandy, dolomitic limestone, gray; Same as 225-230-foot interval. Ostracoda and Foraminifera very rare.

250-255 Sandy, dolomitic limestone, white; Same as 225-230-foot interval with slight increase in percentage of sand and a marked color change from gray to white. Ostracoda and Foraminifera rare.

260-265 Sandy, dolomitic limestone; Same as 250-255-foot interval. Ostracoda and Foraminifera rare.

265-280 Sandy, dolomitic limestone; Same as 250-255-foot interval. Ostracoda and Foraminifera rare.

280-295 Sandy, dolomitic limestone; Same as 250-255-foot interval. Ostracoda and Foraminifera rare.

295-300 Sandy, dolomitic limestone; Same as 250-255-foot interval. Ostracoda and Foraminifera rare.

300-323 Sandy, dolomitic limestone; Same as 250-255-foot interval. Ostracoda and Foraminifera rare.

323-330 Sand, white; 75 percent fine to very fine-grained angular quartz sand. 5 percent white limestone fragments. 20 percent calcareous silt and clay matrix, unconsolidated. Ostracoda and Foraminifera common.

330-340 Sand, white; Same as 323-330-foot interval. Ostracoda and Foraminifera common.

340 Sand, white; Same as 323-330-foot interval. Ostracoda and Foraminifera common.

Ostracoda from the 170 to 340-foot intervals include:
Brachycythere watervalleyensis Howe and Chambers
Loxoconcha claibornensis Murray
Cytheretta alexanderi Howe and Chambers
Monoceratina alexanderi Howe and Chambers

Duplin County

Number 1

Location: Town of Calypso, North Carolina.
Owner: Town of Calypso
Date drilled: 1955
Driller: Heater Well Co.
Elevation of well: 157 feet above sea level

Hydrologic Information

Diameter of well: 8 inches
Depth of well: 215 feet
Cased to: 215 feet
Finish: gravel wall and screens
Static (nonpumping) water level: 36 feet below land surface (1955)
Yield: 500 gallons a minute with a 42-foot drawdown

Log of Well

Depth (feet)

Post-Miocene—surficial sands and clays

0-5 Sand and silt, tan; 65 percent medium to very fine-grained poorly sorted angular quartz sand. 35 percent tan silt and clay matrix, unconsolidated. Fine-grained ilmenite prominent.

5-10 Clay and sand, pink; 45 percent medium to fine-grained subrounded to angular quartz sand. 55 percent pink clay matrix, unconsolidated. Quartz grains stained by hematite prominent. Trace of fine-grained ilmenite.

10-17 Sand and clay, white; 70 percent very coarse to medium-grained subangular to rounded quartz sand. 30 percent white clay matrix, unconsolidated.

Upper Cretaceous—Black Creek formation

17-21 Sand, dark-gray; 80 percent medium to fine-grained subangular to angular quartz sand. 15 percent gray micaceous clay matrix. 5 percent black lignitized plant remains. Trace of light-green weathered glauconite.

21-32 Same as 17-21-foot interval with slight increase in lignitized fragments.

32-41 Clay, black; 15 percent fine to very fine-grained angular quartz sand. 65 percent black micaceous clay matrix, tight. 20 percent black lignitized plant remains. Trace of dark-green fine-grained glauconite.

41-50 Sand and clay, gray; 70 percent fine to very fine-grained angular quartz sand. 25 percent dark-gray micaceous clay matrix, unconsolidated. 5 percent black lignitized plant remains. Trace of scattered marcasite aggregates.

50-61 Clay, black; Same as 32-41-foot interval.

61-68 Sand, gray; 75 pecent fine-grained subangular quartz sand. 20 percent black micaceous silt and clay matrix, unconsolidated. 5 percent black lignitized plant remains. Trace of dark-green glauconite.

68-82 Clay, black; 5 percent fine-grained angular, quartz sand. 85 percent black micaceous clay matrix, very tight. 10 percent black lignitized plant remains. Trace of dark-green glauconite and marcasite aggregates.

82-91 Sand and clay, black; 70 percent fine-grained angular quartz sand. 25 percent black micaceous clay matrix, unconsolidated. 5 percent black lignitized plant fragments. Trace of dark-green glauconite.

91-101 Sand and clay, black: Same as 82-91-foot interval with some increase in grain size of sand.

101-111 Sand and clay, black: Same as 82-91-foot interval with 25 percent of sand occurring in the medium-grain range.

111-120 Sand, black; 80 percent coarse to medium-grained, subrounded quartz sand. 15 percent black micaceous clay matrix. 5 percent black lignitized plant fragments. Trace of glauconite. Marcasite aggregates prominent.

120-125 Sand, black; Same as 111-120-foot interval with 5 percent increase in clay matrix.

125-132 Sand, black; Same as 111-120-foot interval.

132-143 Sand, black; 75 percent medium to fine-grained subangular quartz sand. 20 percent black clay and silt matrix, unconsolidated. 5 percent black lignitized plant fragments. Trace of glauconite and marcasite aggregates.

143-149 Clay, black: Same as 68-82-foot interval.

149-168 Clay, black; Same as 143-149-foot interval.

168-174 Sand, black; 80 percent coarse to medium-grained subrounded

quartz sand. 15 percent black micaceous silt and clay matrix, unconsolidated. 5 percent black lignitized plant fragments. Trace of glauconite and marcasite.

174-181 Sand, black; Same as 168-174-foot interval.

181-201 Sand, black; Same as 168-174-foot interval.

201-215 Sand, black; Same as 168-174-foot interval.

Remarks: No microfossils were obtained from the well cuttings. Correlation is based on lithology and stratigraphic position.

Duplin County

Number 2

Location: 2.8 miles southeast of Kornegay, North Carolina.
Owner: Unknown
Date drilled: 1953
Driller: D. Sutton
Elevation of well: 110 feet above sea level

Hydrologic Information

Depth of well: 130 feet
Cased to: 130 feet
Static (nonpumping) water level: unknown
Yield: Unknown

Log of Well

Depth (feet)

0-34 No sample

Upper Cretaceous—Peedee formation

34-45 Sand, gray; 75 percent fine-grained angular to subangular quartz sand. 15 percent gray clay matrix, unconsolidated. 10 percent dark-green fine-grained glauconite. Ostracoda and Foraminifera very rare.

45-65 Sand, gray; Same as 34-45-foot interval. Ostracoda and Foraminifera very rare.

65-100 Sand, gray; 80 percent fine to very fine-grained angular quartz sand. 5 percent gray micaceous clay matrix, unconsolidated. 15 percent dark-green very fine-grained glauconite. No microfossils.

100-110 Sand, gray; 65 percent fine to medium-grained angular to subangular quartz sand. 20 percent gray micaceous silt matrix, unconsolidated. 15 percent dark-green fine-grained glauconite. Ostracoda and Foraminifera very rare.

110-130 Sand, gray; Same as 100-110-foot interval. Ostracoda and Foraminifera very rare.

Ostracoda from the 34-65- and 100-130-foot intervals include:
Cytheridea (Haplocytheridea) ulrichi (Berry)
Brachycythere rhomboidalis (Berry)
Trachyleberis pidgeoni (Berry)
Velarocythere arachoides (Berry)

Duplin County

Number 3

Location: Warsaw, North Carolina, 1 block northwest of junction of highways U. S. 117 and N. C. 24.
Owner: Warsaw Dress Company
Date drilled: 1952
Driller: Prince Well Co.
Elevation of well: 158 feet above sea level

Hydrologic Information

Diameter of well: 2 inches
Depth of well: 153 feet
Cased to: 153 feet
Finish: open end
Static (nonpumping) water level: Unknown
Yield: Unknown

Log of Well

Depth (feet)

Post-Miocene—surficial sands

0-10 Sand, tan; 90 percent very fine-grained angular to subangular quartz sand. 10 percent tan silt and clay matrix, unconsolidated. Limonitic staining of quartz grains predominant.

10-20 Sand, tan; Same as 0-10-foot interval.

Upper Cretaceous—Peedee formation

20-30 Sand, gray; 80 percent medium to fine-grained subangular quartz sand. 20 percent gray silt and clay matrix, slightly indurated.

30-40 Sand, gray; Same as 20-30-foot interval.

40-50 Sand, gray; 70 percent fine-grained angular quartz sand. 20 percent gray silt and clay matrix, unconsolidated. 10 percent dark-green fine-grained glauconite.

50-60 Sand and clay, gray; 60 percent fine-grained angular quartz sand. 35 percent gray clay matrix, unconsolidated but tight. 5 percent dark-green fine-grained glauconite. Trace of broken abraded shell fragments.

60-70 Sand and clay, gray; Same as 50-60-foot interval.

80-90 Sand and clay, gray; Same as 50-60-foot interval.

110-119 Sand and clay, gray; Same as 50-60-foot interval.

123-133 Sand, gray; 70 percent medium to fine-grained subangular to angular quartz sand. 15 percent gray clay matrix, unconsolidated. 5 percent dark-green fine-grained glauconite. 10 percent broken abraded shell fragments.

133-143 Sand, gray; Same as 123-133-foot interval.

143-153 Sand, gray; Same as 123-133-foot interval with 10 percent increase in shell fragments, and 10 percent decrease in quartz sand.

Remarks: No microfossils were recovered from the samples examined. Correlation is based on lithology and stratigraphic position.

Duplin County

Number 4

Location: Smith Farm on N. C. Route 11, 5.8 miles southwest of Kornegay, North Carolina.
Owner: J. O. Smith
Date drilled: 1953
Driller: D. Sutton
Elevation of well: 85 feet above sea level

Hydrologic Information

Diameter of well: 2 inches
Depth of well: 111 feet
Cased to: 111 feet
Finish: open end
Static (nonpumping) water level: Unknown
Yield: Unknown

Log of Well

Depth (feet)

Post-Miocene—surficial sand

0-10 Sand, tan; 90 percent fine-grained angular quartz sand. 10 percent tan silt and clay matrix, unconsolidated. No microfauna.

Upper(?) and *Middle Eocene*—Castle Hayne limestone

10-18? No sample

Upper Cretaceous—Peedee formation

18-40 Sand, gray; 80 percent medium to fine-grained subangular to subrounded quartz sand. 15 percent gray clay matrix, unconsolidated. 5 percent dark-green fine-grained glauconite. Trace of dark-brown angular phosphate grains. Ostracoda and Foraminifera common.

40-60 Sand, gray; 70 percent medium-grained subrounded quartz sand. 20 percent gray calcareous clay matrix, moderately indurated. 10 percent dark-green fine-grained glauconite. Trace of phosphate pebbles. Ostracoda and Foraminifera abundant.

60-75 Sand, gray; Same as 40-60-foot interval.

75-110 Sand, gray; Same as 40-60-foot interval with trace of broken abraded shell fragments.

110-111 Sand, gray; 85 percent coarse to medium-grained subangular to subrounded quartz sand. 10 percent dark-gray micaceous clay matrix, unconsolidated. 5 percent black lignitized wood-fragments. Trace of dark-green glauconite and marcasite aggregates. Ostracoda and Foraminifera rare.

Ostracoda in samples from 18-111-feet include:
Cytherelloidea swaini Brown
Cytheridea (Haploeytheridea) ulrichi (Berry)
Cytheridea (Haploeytheridea) plummeri Alexander
Trachyleberis pidgeoni (Berry)

Trachyleberis communis (Israelsky)
Velarocythere arachoides (Berry)
Velarocythere scuffeltonensis Brown

Remarks: The presence of Castle Hayne Ostracoda and Foraminifera in the 18-foot sample interval in association with a dominant Peedee fauna suggests that a thin section of the Castle Hayne formation was penetrated in the 10-18(?) foot interval. No sample is available for this interval, but the Castle Hayne limestone is included in the well log on the basis of microfossils.

Duplin County

Number 5

Location: Parker Farm at Chinquapin, North Carolina.
Owner: G. B. D. Parker
Date drilled: 1953
Driller: Owner
Elevation of well: 53 feet above sea level

Hydrologic Information

Diameter of well: 1 inch
Depth of well: 105 feet
Cased to: 15 feet
Finish: open end
Static (nonpumping) water level: Above land surface (flow).
Yield: Flows at ½ gallon a minute (1953)
Chemical analysis of water available

Log of Well

Depth (feet)	
	Upper(?) Eocene—upper part of Castle Hayne limestone
0-15	Shell limestone, white; 15 percent fine to medium-grained angular quartz sand. 65 percent coarse broken shell fragments. 20 percent calcareous clay matrix, deeply weathered, soft. Ostracoda and Foraminifera common.
15-25	Shell limestone, white; Same as 0-15-foot interval with slight increase in shell fragments. Ostracoda and Foraminifera common.
25-35	Shell limestone, white; 10 percent fine-grained angular quartz sand. 75 percent broken abraded shell fragments. 15 percent calcareous matrix, indurated. Ostracoda and Foraminifera common.
35-45	Shell limestone, white; Same as 25-35-foot interval. Ostracoda and Foraminifera common.
45-55	Shell limestone, white: Same as 25-35-foot interval. Ostracoda and Foraminifera common.
55-65	Shell limestone, white; Same as 25-35-foot interval. Ostracoda and Foraminifera common.
65-75	Shell limestone, white; Same as 25-35-foot interval. Ostracoda and Foraminifera common.
75-85	Shell limestone, white; Same as 25-35-foot interval. Ostracoda and Foraminifera common.
85-95	Shell limestone, white; Same as 25-35-foot interval. Ostracoda and Foraminifera common.
95-105	Shell limestone, white; Same as 25-35-foot interval. Ostracoda and Foraminifera common.

Ostracoda occurring in the 0 to 105-foot intervals include:
Cytheridea (Haplocytheridea) montgomeryensis Howe and Chambers
Brachycythere watervalleyensis Howe and Chambers
Trachyleberis broussardi (Howe and Chambers)
Monoceratina alexanderi Howe and Chambers

Remarks: Many of the Ostracoda in this set of samples represent undescribed species. However, these undescribed species have very strong Jackson affinities. Specific identification of both Ostracoda and Foraminifera is made difficult by recrystallization in many of the sample intervals.

Gates County

Number 1

Location: Gates County Prison Camp number 108, 0.4 mile east of junction of U. S. Routes 158 and 158-A.
Owner: N. C. State Highway Commission
Date drilled: 1947
Depth of well: 615 feet
Elevation of well: 29 feet above sea level

Hydrologic Information

No information is available for this well. The following information is given for a nearby well at the Prison Camp.
Diameter of well: 4 inches
Static (nonpumping) water level: 12 feet below land surface (1947)
Depth of well: 318 feet
Cased to: 318 feet
Finish: screen ?
Yield: Unknown

Log of Well

Depth (feet)	
	Post-Miocene—surficial sands
0-20	No sample
20-65	Sand and clay, tan; 75 percent medium-grained subangular well-sorted quartz sand. 25 percent tan clay and silt matrix, unconsolidated.
	Upper Miocene—Yorktown formation
65-164	Marl, gray; 20 percent fine to medium-grained angular quartz sand. 25 percent fine broken shell fragments. 55 percent blue-gray clay matrix, unconsolidated but very compact. Ostracoda rare, Foraminifera common.

Ostracoda from the 65-164-foot interval include:
Murrayina martini (Ulrich and Bassler)
Orionina vaughani (Ulrich and Bassler)
Hemicythere conradi Howe and McGuirt
Loxoconcha purisubrhomboidea Edwards

	Middle Miocene(?)—unnamed unit
164-179	Sand and clay, brown; 70 percent medium to fine-grained subangular to angular quartz sand. 25 percent brown clay and silt matrix unconsolidated but compact. 5 percent black phosphate grains and shards. Trace of dark-green glauconite and broken shell fragments. No Ostracoda, Foraminifera very rare.
179-184	Sand and clay, dark-brown; Same as 164-179-foot interval with phosphate increasing to 10 percent. No Ostracoda, Foraminifera very rare.
	Paleocene(?)—unnamed unit
184-203	Glauconitic sand, dark-green; 40 percent medium to fine-grained subangular quartz sand. 25 percent dark-green medium-grained glauconite. 35 percent dark-green clay matrix, unconsolidated. Very fine-grained euhedral pyrite crystals prominent. No microfossils.
203-220	Glauconitic sand, apple-green; 30 percent medium-grained angular to subangular quartz sand. 35 percent dark-green medium-grained glauconite. 35 percent apple-green clay matrix, unconsolidated but compact. No Ostracoda, Foraminifera very rare.
220-245	Glauconitic sand, dark-green; 35 percent medium-grained subangular quartz sand. 25 percent dark-green medium-grained glauconite. 40 percent dark-green clay and silt matrix, unconsolidated but compact. Very fine-grained euhedral pyrite crystals prominent. No microfossils.
245-291	Sand and clay, gray; 60 percent fine to medium-grained angular quartz sand. 40 percent gray micaceous clay matrix, unconsolidated but very compact. No microfossils.
291-312	Sand and clay; gray; Same as 245-291-foot interval with a 10 percent decrease in clay matrix. No microfossils.
312-340	Clay and sand, brick-red; 30 percent medium-grained angular water-polished quartz sand. 65 percent brick-red clay matrix, unconsolidated but very compact. 5 percent red hematite aggregates. No Ostracoda, Foraminifera very rare.
340-388	Sand and clay, red; 60 percent medium to fine-grained angular quartz sand. 40 percent red clay matrix, unconsolidated but compact. Trace of dark-green glauconite and black phosphate shards. No microfossils.
388-390	Sand, white; 80 percent medium-grained angular well-sorted quartz sand. 20 percent white micaceous clay matrix, unconsolidated. Trace of dark-green glauconite. No microfossils.
390-416	Sand and clay, light-gray; 75 percent medium-grained angular well-sorted quartz sand. 25 percent light-gray micaceous clay matrix, unconsolidated. No Ostracoda, Foraminifera very rare.
416-422	Sand and clay, light-gray; Same as 390-416-foot interval. No microfossils.
422-431	Sand and clay, brick-red; 65 percent medium to fine-grained angular quartz sand. 3 percent brick-red micaceous clay matrix, unconsolidated but very compact. Trace of red hematite aggregates. No microfossils.

431-450 Sand and clay, tan; 75 percent fine to medium-grained angular to subangular quartz sand. 25 percent tan micaceous clay matrix, unconsolidated. Trace of dark-green glauconite. No microfossils.

450-454 Sand and clay, tan; Same as 431-450-foot interval.

454-461 Sand and clay, tan; Same as 431-450-foot interval.

461-479 Sand and clay, gray; 75 percent medium to fine-grained angular quartz sand. 25 percent gray micaceous clay matrix, unconsolidated but compact. No microfossils.

479-485 Sand and clay, gray; Same as 461-479-foot interval.

Upper Cretaceous—Peedee formation

485-615 Sand and clay, dark-gray; 60 percent fine-grained angular quartz sand. 40 percent dark-gray micaceous clay matrix, unconsolidated but compact. Broken shell fragments common. Ostracoda and Foraminifera very rare.

Ostracoda recovered from the 485-615-foot interval are:
Cytherella herricki Brown
Cytherelloidea sohni Brown
Cytheridea (Haplocytheridea) monmouthensis Berry
Truchyleberis communis (Israelsky)

Remarks: No Ostracoda were recovered from intervals between 164 and 485 feet. Correlation of the interval designated as middle Miocene(?) is based on the presence of *Siphonogenerina spinosa* (Bagg) in the 164-179-foot interval and in the 179-184-foot interval. The interval between 184 and 485-feet is provisionally referred to the Paleocene on the basis of good faunal evidence in nearby wells.

Greene County

Number 1

Location: Moye Farm on an unnumbered county road, 2 miles northeast of Maury, North Carolina.
Owner: George Moye
Date drilled: 1954
Driller: Heater Well Co.
Elevation of well: 73 feet above sea level

Hydrologic Information

Diameter of well: 10 inches
Depth of well: 341 feet
Static (nonpumping) water level: 20 feet below land surface (1954).
Yield: Tested at 550 gallons a minute with a 122-foot drawdown (1954)
Cased to: 341 feet
Finish: gravel wall and screens

Log of Well

Depth (feet)

Post-Miocene—surficial sands

8-31 Sand, white; 90 percent coarse-grained subrounded quartz sand. 10 percent tan clay matrix, unconsolidated. No microfossils.

31-41 Sand, tan; Same as 8-31-foot interval with limonitic staining of quartz grains predominant. No microfossils.

Upper Cretaceous—Peedee formation

41-58 Sand, tan; 80 percent coarse to medium-grained subangular quartz sand. 20 percent tan silt and clay matrix, unconsolidated. Trace of light-green weathered glauconite. No microfossils.

58-61 Sand, tan; Same as 41-58-foot interval. No microfossils.

61-71 Sand, tan; Same as 41-58-foot interval. No microfossils.

71-81 Sand, tan; Same as 41-58-foot interval. No microfossils.

81-87 Sand, tan; Same as 41-58-foot interval. No microfossils.

Upper Cretaceous—Black Creek formation

87-91 Clay and sand, black; 30 percent fine-grained angular quartz sand. 65 percent black micaceous clay matrix, unconsolidated. 5 percent black lignitized plant fragments. Dark-green fine-grained glauconite prominent. Trace of broken shell fragments and marcasite aggregates. Ostracoda and Foraminifera common.

91-101 Clay and sand, black; Same as 87-91-foot interval. Ostracoda common, Foraminifera rare.

101-136 Clay, black; 10 percent fine-grained angular quartz sand. 85 percent black micaceous clay matrix, unconsolidated. 5 percent dark-green fine-grained glauconite. Black lignitized plant fragments prominent. Trace of marcasite aggregates and broken shell fragments. Ostracoda common, Foraminifera rare.

136-141 Clay, black; Same as 101-136-foot interval. Ostracoda and Foraminifera rare.

141-151 Clay, black; Same as 101-136-foot interval. Ostracoda and Foraminifera rare.

151-162 Clay and sand, black; 30 percent fine-grained angular quartz sand. 60 percent black micaceous clay matrix, unconsolidated. 10 percent black lignitized plant fragments. Trace of glauconite and shell fragments. Ostracoda and Foraminifera rare.

162-180 Sand, gray; 85 percent medium to coarse-grained subrounded to subangular quartz sand. 15 percent black micaceous clay matrix, unconsolidated. Trace of glauconite marcasite aggregates and fine broken shell fragments. Ostracoda common, Foraminifera rare.

Ostracoda from the 87-162-foot interval include:
Cytheropteron (Eocytheropteron) striatum Brown
Brachycythere ledaforma (Israelsky)
Brachycythere sphenoides (Reuss)
Brachycythere nausiformis Swain
Alatacythere sp. aff. *A gulfensis* (Alexander)
Orthonotacythere tarensis Brown
Orthonotacythere sulcata Brown

Upper Cretaceous—Tuscaloosa formation

180-193 Clay and sand, light-gray; 30 percent medium-grained subrounded quartz sand. 70 percent gray micaceous clay matrix, unconsolidated but tight.

193-201 Clay and sand, light-gray; Same as 180-193-foot interval.

201-213 Clay and sand, light-gray; Same as 180-193-foot interval.

213-220 Sand, gray; 90 percent coarse to medium-grained subrounded quartz sand. 10 percent gray silt and clay matrix, unconsolidated. Trace of mica flakes.

220-227 Sand and clay, gray; 60 percent coarse-grained subrounded quartz sand. 40 percent gray clay matrix, unconsolidated.

227-241 Sand and clay, gray; Same as 220-227-foot interval.

241-251 Sand and clay, gray; Same as 220-227-foot interval.

251-261 Sand and clay, gray; Same as 220-227-foot interval.

261-278 Sand and clay, gray; Same as 220-227-foot interval.

278-289 Sand, gray; 80 percent coarse-grained subrounded quartz sand. 15 percent gray clay matrix, unconsolidated. 5 percent coarse-grained blocky potash feldspar.

289-296 Sand, gray; Same as 278-289-foot interval.

296-308 Sand, gray; Same as 278-289-foot interval.

308-330 Sand, gray; Same as 278-289-foot interval.

Remarks: No microfossils were recovered from the 41-to 87 and 180-to 330-foot intervals. Correlation of these intervals is based upon lithology and stratigraphic position as inferred from nearby outcropping sections.

Hertford County

Number 1

Location: City well at Murfreesboro, North Carolina, located at the high school athletic field.
Owner: City of Murfreesboro
Date drilled: 1954
Driller: Heater Well Co.
Elevation of well: 64 feet above sea level

Hydrologic Information

Diameter of well: 12 inches
Depth of well: 432 feet
Static (nonpumping) water level: 62 feet below land surface (1954)
Yield: 1,000 gallons a minute
Cased to: 432 feet
Finish: gravel wall and screens

Log of Well

Depth (feet)

Post-Miocene—surficial sands and clays

0-6 Sand and clay, tan; 70 percent fine to very fine-grained angular quartz sand. 30 percent tan clay matrix, unconsolidated but compact.

6-30 Sand and clay, gray; 55 percent fine to medium-grained angular to subangular quartz sand. 45 percent gray clay matrix, unconsolidated but compact.

Upper Miocene—Yorktown formation

30-40 Clay and sand, gray; 25 percent fine to medium-grained angular quartz sand. 65 percent blue-gray clay matrix, unconsolidated but very compact. 10 percent fine broken shell fragments. Trace of fine mica flakes. Ostracoda and Foraminifera common.

40-50 Clay and sand, gray; Same as 30-40-foot interval. Ostracoda and Foraminifera common.

50-58 Clay and sand, gray; Same as 30-40-foot interval. Ostracoda and Foraminifera common.

58-62 Marl, gray; 30 percent fine to medium-grained angular quartz sand. 35 percent fresh shell and shell fragments. 35 percent blue-gray clay matrix, unconsolidated. Ostracoda and Foraminifera common.

62-88 Marl, gray; Same as 58-62-foot interval. Ostracoda and Foraminifera common.

Ostracoda from the 30-62-foot intervals include:
Cytherura elongata Edwards
Puriana rugipunctata (Ulrich and Bassler)
Actinocythereis exanthemata (Ulrich and Bassler)
Actinocythereis mundorffi (Swain)
Orionina vaughani (Ulrich and Bassler)
Hemicythere confragosa Edwards
Hemicythere schmidtae Malkin
Cushmanidea ashermani (Ulrich and Bassler)

Paleocene(?) and *Upper Cretaceous(?)*—undifferentiated

88-105 Sand and clay, gray; 65 percent medium to fine-grained subrounded to angular quartz sand. 35 percent gray clay matrix, unconsolidated but tight. Trace of black lignitized wood fragments.

105-118 Sand and clay, gray; Same as 88-105-foot interval.

118-149 Sand and clay, brown; 60 percent medium to fine-grained subangular to angular quartz sand. 30 percent reddish-brown clay matrix, unconsolidated but very compact. 10 percent red hematite aggregates. Coarse mica flakes prominent.

149-159 Sand and clay, brown; Same as 118-149-foot interval but well cemented in streaks.

159-161 Sand, white; 90 percent fine to very fine-grained angular quartz sand. 10 percent white clay matrix, unconsolidated. Trace of fine mica flakes and black lignitized wood fragments.

161-173 Sand and clay, brick-red; 55 percent medium to fine-grained subangular quartz sand. 35 percent brick-red clay matrix, unconsolidated but very compact. 10 percent red hematite aggregates. Trace of pyrite.

173-192 Clay and sand, gray; 30 percent very fine-grained angular quartz sand. 70 percent gray micaceous clay matrix, unconsolidated and very compact.

192-195 Clay and sand, gray; Same as 173-192-foot interval.

195-217 Sand, light-gray; 90 percent coarse to fine-grained subrounded to angular poorly-sorted quartz sand. 10 percent light-gray clay matrix, unconsolidated. Trace of black lignitized wood fragments.

217-225 Clay, gray; 15 percent fine-grained angular quartz sand. 85 percent gray micaceous clay matrix, unconsolidated but very compact. Trace of red hematite aggregates and black lignitized wood fragments.

225-255 Clay, gray; Same as 217-225-foot interval.

255-275 Clay, gray; Same as 217-225-foot interval.

275-320 Sand, gray; 90 percent very coarse to medium-grained rounded to subrounded quartz sand. 10 percent gray clay matrix, unconsolidated.

Upper Cretaceous—Tuscaloosa formation

320-334 Sideritic sand, brown; 20 percent medium-grained subangular quartz sand. 65 percent brown spherulitic siderite pellets and aggregates. 15 percent brown clay matrix, unconsolidated.

334-403 Sand and clay, gray; 60 percent coarse to medium-grained subrounded quartz sand. 35 percent gray micaceous clay matrix, unconsolidated but very compact. 5 percent red hematite aggregates and black lignitized wood fragments.

403-432 Sand, gray; 90 percent very coarse to medium-grained subrounded to subangular quartz sand. 10 percent gray clay matrix, unconsolidated. Black lignitized wood fragments prominent.

Remarks: On the basis of information from downdip wells the intervals between 88 and 320-feet are thought to be of Paleocene age in part and of Peedee and Black Creek age in part. No microfossils were recovered from below 88 feet. The entire interval below 88 feet is thought to be of continental or deltaic origin. The top of the Tuscaloosa formation is placed at 320 feet and is based on the occurrence of abundant siderite pellets which mark the top of the Tuscaloosa in other wells.

Hertford County

Number 2

Location: Ahoskie, North Carolina, city well number 3.
Owner: City of Ahoskie
Date drilled: 1950
Driller: Layne Atlantic Co.
Elevation of well: 53 feet above sea level

Hydrologic Information

Diameter of well: 8 inches
Depth of well: 245 feet, filled back to 202 feet
Cased to: 202 feet
Finish: gravel wall and screens
Static (nonpumping) water level: 37 feet below land surface (1950)
Yield: 330 gallons a minute
Chemical analysis of water available

Log of Well

Depth (feet)

Post-Miocene—surficial sands and clays

0-10 Sand and clay, yellow; 65 percent fine to very fine-grained angular quartz sand. 35 percent yellow clay matrix, unconsolidated but very compact. Trace of fine-grained ilmenite and fine mica flakes. No microfossils.

10-20 Sand, yellow; 85 percent coarse to fine-grained subrounded to angular poorly-sorted quartz sand. 10 percent yellow clay matrix, unconsolidated. 5 percent medium-grained potash feldspar. Trace of coarse gravel. Limonitic staining of quartz sand predominant.

20-31 Sand, yellow; 90 percent medium-grained subangular well-sorted quartz sand. 10 percent light-gray clay matrix, unconsolidated. Limonitic staining of quartz grains prominent.

31-55 Sand, yellow; Same as 20-31-foot interval.

Upper Miocene—Yorktown formation

55-80 Sand, gray; 80 percent medium to fine-grained subangular to angular quartz sand. 20 percent gray clay matrix, unconsolidated. Trace of phosphate, shell fragments and sponge spicules.

Paleocene—unnamed unit

80-110 Glauconitic sand and clay, dark-gray; 45 percent very coarse to medium-grained subrounded to subangular quartz sand. 30 percent dark-green medium to coarse-grained glauconite. 25 percent dark-gray micaceous clay matrix, indurated. Coarse broken shell fragments prominent.

110-118 Sand, light-gray; 65 percent coarse to medium-grained subrounded to subangular quartz sand. 20 percent gray to yellow clay matrix, indurated and moderately consolidated. 10 percent rounded medium gravel. 5 percent dark-green medium-grained glauconite. Trace of coarse broken abraded shell fragments.

118-124 Sand, light-gray; Same as 110-118-foot interval with slight increase in percentage of gravel.

Upper Cretaceous—undifferentiated

124-133 Sand, yellow; 70 percent coarse to medium-grained subrounded to subangular quartz sand. 15 percent yellow clay matrix, unconsolidated. 10 percent dark-green medium-grained glauconite. 5 percent fine rounded gravel. Coarse broken shell fragments prominent. Trace of coarse mica flakes.

133-147 Clay and sand, light-gray; 35 percent medium to very fine-grained subangular to angular poorly-sorted quartz sand. 65 percent gray clay matrix, unconsolidated but very compact. Dark-green medium to fine-grained glauconite prominent.

147-160 Sand and clay, mottled-pink; 60 percent medium to fine-grained angular quartz sand. 25 percent mottled-pink to yellow clay matrix, unconsolidated but very compact. 15 percent coarse blocky calcic feldspar grains. Trace of coarse abraded shell fragments fine gravel and dark-green glauconite.

160-203 Sand, gray; 85 percent very coarse to medium-grained subangular quartz sand. 5 percent gray clay matrix, unconsolidated. 10 percent coarse blocky calcic feldspar grains.

203-228 Sand, pink; 65 percent very coarse to medium-grained subangular quartz sand. 20 percent pink clay matrix, unconsolidated but compact. 15 percent coarse blocky calcic feldspar grains. Trace of dark-green fine-grained glauconite and hematite aggregates.

228-239 Sand, pink; Same as 203-228-foot interval, but with medium-grained quartz sand predominant.

239-245 Sand, pink; Same as 228-239-foot interval.

Remarks: No microfossils were recovered from the intervals sampled in this well. Correlation is based on stratigraphic position and lithologic similarity to downdip sections which carry a diagnostic fauna. The interval designated as undifferentiated Upper Cretaceous in this well is thought to represent a marginal deltaic deposit of the Peedee formation.

Hoke County

Number 1

Location: Well number 1 at North Carolina Sanitorium, 2 miles east of McCain.
Owner: North Carolina Sanitorium
Date drilled: May 1954
Driller: Heater Well Co.
Elevation of well: 510 feet above sea level

Hydrologic Information

Diameter of well: 18 inches to 10 inches
Depth of well: 401 feet
Cased to: 401 feet
Finish: Gravel wall and screens
Static (nonpumping) water level: 163 feet below land surface (1953)
Yield: Tested at 450 gallons a minute with a 43-foot drawdown (1953)

Log of Well

Depth (feet)

Upper Cretaceous—Tuscaloosa formation

0-20 Sand and clay, tan; 60 percent coarse to medium-grained angular to subangular quartz sand. 15 percent coarse-grained blocky potash feldspar. 25 percent tan clay matrix, unconsolidated.

20-30 Sand and clay, tan; Same as 0-20-foot interval.

30-45 Sand and clay, tan; Same as 0-20-foot interval with mica flakes prominent.

45-66 Sand and clay, white; Same as 0-20-foot interval with change in color.

66-98 Clay, pink; 10 percent fine to medium-grained angular quartz sand. 90 percent pink clay matrix, unconsolidated but tight.

98-121 Sand and clay, white; Same as 45-66-foot interval.

121-129 Clay, pink; 20 percent fine to medium-grained angular to subangular quartz sand. 80 percent pink clay matrix, unconsolidated. Trace of mica flakes.

129-133 Sand and clay, pink; 65 percent medium to coarse-grained subrounded quartz sand. 30 percent pink clay matrix, unconsolidated but tight. 5 percent red hematite concretions. Trace of very fine-grained ilmenite.

133-149 Sand and clay; Same as 129-133-foot interval with a change in color.

149-170 Sand and clay, white; Same as 133-149-foot interval.

181-190 Sand and clay, white; Same as 133-149-foot interval.

201-236 Sand and clay, white; Same as 133-149-foot interval.

236-247 Clay, pink; 15 percent fine to very fine-grained angular quartz sand. 85 percent pink clay matrix, unconsolidated but tight.

247-256 Sand and clay, pink; 45 percent fine to coarse-grained subangular to subrounded quartz sand. 20 percent coarse-grained blocky potash feldspar. 35 percent pink clay matrix, unconsolidated.

256-277 Sand, white; 70 percent coarse to medium-grained subrounded quartz sand. 15 percent coarse-grained subangular potash feldspar. 15 percent white chalky clay matrix, unconsolidated.

277-301 Sand and clay, white; 60 percent fine to medium-grained subangular quartz sand. 5 percent coarse-grained blocky potash feldspar. 35 percent white chalky clay matrix, unconsolidated.

301-333 Sand and clay, white; Same as 277-301-foot interval.

341-356 Sand and clay, pink; Same as 277-301-foot interval with a change in color.

basement rocks

380-390 Schist, yellow to green: rotten micaceous chloritic schist, highly weathered.

390-401 Schist, yellow to green; Same as 380-390-foot interval.

Remarks: No microfossils were recovered in cuttings from this well. Correlation with the Tuscaloosa formation is based on lithology and stratigraphic position.

Hyde County

Number 1

Location: Rhem Oil Test, 1 mile north of Ponzer, North Carolina.
Owner: Davidson Oil Co.
Date drilled: 1951
Driller: Davidson Oil Co.
Elevation of well: 9 feet above sea level

Hydrologic Information

None available. This well is included for its stratigraphic value.

Log of Well

Depth (feet)

0-300 No sample

Middle Eocene—lower part of Castle Hayne limestone

300-340 Shell limestone, light-gray; 15 percent medium to fine-grained subrounded to angular quartz sand. 50 percent broken shell and limestone fragments. 35 percent calcareous matrix, consolidated and hard but very porous. Ostracoda and Foraminifera rare. recrystallized.

340-380 Shell limestone, light-gray; Same as 300-340-foot interval. Ostracoda and Foraminifera rare, recrystallized.

380-460 No sample.

460-500 Shell limestone, light-gray; Same as 300-340-foot interval. Ostracoda and Foraminifera common.

500-550 Sandy limestone, light-gray; 35 percent medium to fine-grained subrounded to angular quartz sand. 45 percent gray calcareous matrix, well consolidated and hard. 15 percent coarse broken shell and limestone fragments. 5 percent dark-green glauconite and black phosphate. Ostracoda and Foraminifera common.

550-600 Sandy limestone, light-gray; Same as 500-550-foot interval with dark-green glauconite increasing to 10 percent.

630-660 Sandy limestone, light-gray; Same as 550-600-foot interval. Ostracoda and Foraminifera common.

660-690 Calcareous sand, light-gray; 50 percent coarse to medium-grained subrounded quartz sand. 25 percent gray calcareous clay matrix, unconsolidated. 15 percent coarse broken shell and limestone fragments. 10 percent dark-green medium-grained glauconite. Ostracoda and Foraminifera common.

Ostracoda from the 300-600-foot intervals include:
Cytheridea (Clithrocytheridea) virginica (Schmidt)
Trachyleberis bassleri (Ulrich)
Trachyleberis rukasi (Gooch)
Pterygocythereis washingtonensis Swain
Actinocythereis hilgardi (Howe and Garrett)
Cytheromorpha cf. *C. eocenica* Stephenson

Upper Cretaceous—Peedee formation

690-720 Calcareous sand, light-gray; 85 percent medium to fine-grained subangular quartz sand. 15 percent gray calcareous matrix, well consolidated and very hard. Trace of dark-green glauconite.

Ostracoda from the 690-720-foot interval are:
Eucytherura curta (Jennings)
Trachyleberis communis (Israelsky)
Platycythereis costatana angula (Schmidt)
Velarocythere cacumenata Brown
Velarocythere eikonata Brown

Remarks: Samples from this well extend to a depth of 2,700 feet. Ostracoda and Foraminifera are rare below 930 feet. The samples are badly contaminated by cavings. *T. rukasi* (Gooch) and various Miocene Miliolidae occur in samples to 2,600+ feet. The writer would place the top of the Black Creek formation between 1,020 and 1,140 feet, based on the highest occurrence of *Protocythere paratriplicata* Swain and *Brachycythere sphenoides* (Reuss). No diagnostic Ostracoda of pre-Black Creek age were recovered. In the bottom sample 2670-2700-feet are several immature specimens, which on the basis of external features represent *Leptocythere* (?) *sp.* and resemble *Leptocythere imlayi* Swain and Peterson from the upper part of the Sundance formation of Late Jurassic age. No internal features were observed.

Jones County

Number 1

Location: Oak Grove Naval Auxillary Air Station at Oak Grove, North Carolina.

Owner: U. S. Navy
Date drilled: 1942
Driller: Heater Well Co.
Elevation of well: 30 feet above sea level

Hydrologic Information

Diameter of well: 8 inches
Depth of well: 299 feet
Cased to: Unknown
Finish: Screens
Static (nonpumping) water level: Unknown
Yield: Unknown

Log of Well

Depth (feet)

Post-Miocene—surficial sand

0-23 Sand, buff to white; 85 percent medium to fine-grained subangular to angular quartz sand. 10 percent buff-colored clay matrix, unconsolidated. 5 percent reworked partially recrystallized calcareous aggregates. No Ostracoda, Foraminifera very rare.

Upper(?) Eocene—upper part of Castle Hayne limestone

23-45 Sand and limestone, tan; 40 percent fine to medium-grained, angular to subangular quartz sand. 50 percent tan partially-recrystallized calcareous matrix, well consolidated and hard. 10 percent broken recrystallized shell fragments. Ostracoda and Foraminifera common.

45-53 Calcareous sand, light-tan; 65 percent fine to very fine-grained angular quartz sand. 35 percent tan partially recrystallized calcareous matrix, moderately consolidated. Trace of broken recrystallized shell fragments. Ostracoda and Foraminifera common.

53-87 Sand, white; 85 percent fine to very fine-grained angular quartz sand. 15 percent white calcareous matrix, unconsolidated. Trace of white shell and limestone fragments. Ostracoda and Foraminifera abundant.

87-97 Calcareous sand, light-gray; 75 percent fine-grained angular water-polished quartz sand. 25 percent gray recrystallized calcareous matrix, indurated and well consolidated. Trace of recrystallized shell fragments. Ostracoda and Foraminifera abundant, recrystallized.

97-140 Calcareous sand, white; 90 percent very fine-grained angular quartz sand. 10 percent white calcareous clay matrix, indurated and very loosely consolidated. Trace of broken shell and limestone fragments. Ostracoda and Foraminifera common.

Ostracoda from the 23-140-foot intervals include:
Bairdia sp. B
Cytheridea (Clithrocytheridea) caldwellensis Howe and Chambers
Cytheropteron sp. A
Trachyleberis sp. A and *sp.* B
Loxoconcha sp. A
Cytheretta alexanderi Howe and Chambers
Monoceratina alexanderi Howe and Chambers

140-220 No sample.

Lower Eocene(?)—unnamed unit

220-235 Sandy limestone, gray; 35 percent medium to fine-grained subangular quartz sand. 45 percent gray calcareous matrix, well consolidated and very hard. 15 percent partially-recrystallized broken shell fragments. 5 percent dark-green fine-grained glauconite. Ostracoda and Foraminifera rare.

235-250 Calcareous sand, gray; 65 percent coarse to medium-grained subangular quartz sand. 25 percent white calcareous clay matrix, indurated and well consolidated. 5 percent dark-green medium-grained glauconite. 5 percent coarse phosphate pebbles. Broken shell fragments prominent. Ostracoda and Foraminifera rare.

250-260 Calcareous sand, gray; Same as 235-250-foot interval, very hard. Ostracoda and Foraminifera rare.

Ostracoda from the 220-250-foot intervals include:
Brachycythere cf. B. marylandica (Ulrich and Bassler)
Trachyleberis bassleri (Ulrich)
Trachyleberis communis aquia (Schmidt)

Upper Cretaceous—Peedee formation

260-265 Sand, gray; 90 percent coarse to medium-grained subrounded to subangular quartz sand. 10 percent gray calcareous clay matrix, indurated and moderately consolidated.

Ostracoda from the 260-265-foot interval include:
Cytheridea (Haplocytheridea) ulrichi (Berry)
Eucytherura curta (Jennings)
Brachycythere rhomboidalis (Berry)
Velarocythere legrandi Brown
Velarocythere sp. aff. *V. arachoides* (Berry)

Lenoir County

Number 1

Location: Town of LaGrange, North Carolina on U. S. Route 70, 2.7 miles east of the Wayne-Lenoir County line.
Owner: Town of LaGrange
Date drilled: 1952
Driller: Layne-Atlantic Co.
Elevation of well: 105 feet above sea level

Hydrologic Information

Diameter of well: 6 inches
Depth of well: 353 feet
Cased to: 353 feet
Finish: Gravel wall and screens
Static (nonpumping) water level: 44 feet below land surface (1952)
Yield: Tested at 200 gallons a minute with a 33 foot drawdown

Log of Well

Depth (feet)

Post-Miocene—surficial sands and clays

0-5 Sand, gray; 85 percent coarse to medium-grained rounded to subrounded quartz sand. 15 percent gray silt and clay matrix, unconsolidated.

5-13 Sand, gray; Same as 0-5-foot interval with slight decrease in grain size of quartz sand.

Upper Cretaceous—Black Creek formation

13-23 Sand, gray; 80 percent very coarse sand and fine gravel, subangular. 20 percent gray clay matrix, unconsolidated.

23-43 Sand, gray; 85 percent coarse to medium-grained subrounded quartz sand. 15 percent gray clay matrix, unconsolidated.

43-49 Sand, dark-gray; 90 percent medium-grained subrounded quartz sand. 10 percent gray silt and clay matrix, unconsolidated. Trace of black lignitized wood fragments.

49-64 Sands and clay, black; 60 percent fine-grained angular quartz sand. 35 percent black silt and clay matrix, unconsolidated but tight. 5 percent black lignitized wood fragments. Dark-green fine-grained glauconite prominent.

64-84 Sand, gray; Same as 23-43-foot interval.

84-105 Sand, gray; Same as 23-43-foot interval.

105-116 Sand, gray; Same as 23-43-foot interval.

116-125 Sand and clay, black; 65 percent fine to medium-grained angular to subangular poorly-sorted quartz sand. 30 percent black micaceous clay matrix, unconsolidated. 5 percent black lignitized wood fragments.

125-136 Sand and clay, black; Same as 116-125-foot interval.

136-146 Sand and clay, black; Same as 116-125-foot interval.

146-165 Sand and clay, black; Same as 116-125-foot interval with slight increase in amount of mica.

Upper Cretaceous—Tuscaloosa formation

165-187 Clay and sand, light-gray; 25 percent very fine to medium-grained angular to subangular poorly-sorted quartz sand. 75 percent gray clay matrix, unconsolidated but very tight.

187-207 Clay and sand, gray; Same as 165-187-foot interval.

207-224 Sand and clay, gray; 70 percent medium to fine-grained subangular to angular poorly-sorted quartz sand. 30 percent gray clay matrix, unconsolidated but tight.

224-228 Sand, white; 95 percent very coarse to medium-grained subrounded to subangular quartz sand. 5 percent gray clay matrix, unconsolidated. Trace of marcasite-cemented aggregates.

228-239 Sand, gray; Same as 224-228-foot interval with 10 percent increase in clay matrix.

239-254 Sand, gray; Same as 228-239-foot interval.

254-274 Clay and sand, gray; 30 percent fine to medium-grained angular to subangular quartz sand. 70 percent gray clay matrix unconsolidated but tight.

274-279 Sand, light-gray; 90 percent coarse to fine-grained subrounded to angular quartz sand. 10 percent gray clay matrix, unconsolidated.

279-289 Sand, light-gray; Same as 274-279-foot interval.
289-304 Sand, light-gray; 90 percent medium-grained subrounded well-sorted quartz sand. 10 percent gray clay matrix, unconsolidated.
304-310 Sand and clay, light-gray; 60 percent fine to very fine-grained angular quartz sand. 40 percent gray clay matrix, unconsolidated but tight.
310-320 Sand an clay, light-gray; Same as 304-310-foot interval.
320-327 Sand and clay, light-gray; Same as 304-210-foot interval with 15 percent of quartz sand occurring in the medium-grain size.
327-343 Sand and clay, red to gray; 65 percent coarse to fine-grained subrounded to angular poorly-sorted quartz sand. 35 percent red to gray silt and clay matrix, unconsolidated. Hematite-cemented aggregates prominent.
343-349 Sand, red; 80 percent coarse to medium-grained subrounded quartz sand. 20 percent red hematitic-clay matrix, loosely consolidated.
349-353 Sand, pink; 95 percent coarse to medium-grained subrounded quartz sand. 5 percent red hematitic-clay matrix, unconsolidated.
353-363 Sand, pink; Same as 349-353-foot interval with quartz much more angular and 10 percent increase in percentage of clay matrix.
363-371 Sand, pink; Same as 353-363-foot interval.
371-383 Sand, pink; Same as 353-363-foot interval.
383-392 Sand, gray; mostly cavings from above.

basement rocks

392-403 Weathered granite, brown.
403-404 Granite.

Remarks: No microfossils were obtained from this well. Correlation is based on lithology and stratigraphic position.

Lenoir County

Number 2

Location: Well number 5 at city of Kinston, located at the corner of Caswell and Adkins Streets.
Owner: City of Kinston
Date drilled: 1955
Driller: Heater Well Co.
Elevation of well: 32 feet above sea level

Hydrologic Information

Diameter of well: 10 inches
Depth of well: Plugged at 459 feet
Static (nonpumping) water level: 25 feet below land surface (1955)
Yield: Tested at 1,000 gallons a minute with a 34-foot drawdown
Cased to: 459 feet
Finish: gravel wall and screens
Chemical analysis of water available

Log of Well

Depth (feet)

0-5 No sample

Post-Miocene—surficial sand

5-17 Sand, gray; 90 percent coarse to fine-grained subangular poorly-sorted quartz sand. 10 percent gray clay matrix, unconsolidated.

Upper Cretaceous—Peedee formation

17-29 Sand and clay, gray; 55 percent fine to very fine-grained angular quartz sand. 45 percent gray silt and clay matrix, unconsolidated, tight. Dark-green very fine-grained glauconite prominent. Ostracoda and Foraminifera rare.
29-38 Sand, gray; 85 percent coarse to medium-grained subangular to subrounded quartz sand. 10 percent gray clay matrix, unconsolidated. 5 percent dark-green medium-grained glauconite. Phosphate nodules prominent. Trace of broken shell fragments. Ostracoda and Foraminifera common.
38-42 Sand, gray; Same as 29-38-foot interval with slight increase in glauconite content. Ostracoda and Foraminifera rare.
42-48 Clay and sand, black; 30 percent fine to medium-grained subangular quartz sand. 65 percent black clay and silt matrix, unconsolidated. 5 percent dark-green fine-grained glauconite. Mica flakes, and pyrite aggregates prominent. Few broken shell fragments. Ostracoda and Foraminifera rare.
48-53 Clay and sand, black; Same as 42-48-foot interval with 10 percent increase in quartz sand. Ostracoda and Foraminifera rare.
53-61 Sand and clay, black; 75 percent fine to medium-grained subangular quartz sand. 20 percent black clay matrix, 5 percent dark-green glauconite. Ostracoda and Foraminifera common.
61-77 Sand, black; 80 percent coarse to medium-grained angular to subangular quartz sand. 15 percent black silt and clay matrix, unconsolidated. 5 percent dark-green medium-grained glauconite. Broken and abraded shell fragments prominent. Ostracoda and Foraminifera abundant.
77-80 Sand and shell, gray; 5 percent fine to medium-grained subangular quartz sand. 30 percent broken shell fragments. 15 percent gray silt and clay matrix, indurated. Ostracoda and Foraminifera abundant.
80-85 Sand and shell, gray; 70 percent coarse to medium-grained subangular quartz sand. 15 percent broken and abraded shell fragments. 15 percent silt and clay matrix, unconsolidated to partially indurated. Ostracoda and Foraminifera common.
85-88 Sand and shell, gray; Same as 77-80-foot interval. Ostracoda and Foraminifera common.
88-91 Sand, gray; 90 percent coarse to medium-grained subrounded quartz sand. 10 percent gray silt and clay matrix, unconsolidated. Trace of broken shell fragments glauconite and small phosphate nodules. Ostracoda and Foraminifera rare.
91-93 Sand, gray; Same as 88-91-foot interval. Moderately indurated. Ostracoda and Foraminifera rare.
93-103 Sand, gray; 95 percent medium to coarse-grained subangular to subrounded quartz sand. 5 percent gray silt and clay matrix, unconsolidated. Trace of fine-grained glauconite and broken shell fragments. Ostracoda and Foraminifera abundant.
103-115 Sand, gray; Same as 93-103-foot interval. Ostracoda and Foraminifera abundant.
115-122 Sand, gray; Same as 93-103-foot interval. Glauconite increases to 5 percent. Ostracoda rare, Foraminifera common.
122-125 Sand and shell, gray; 65 percent coarse to medium-grained subangular quartz sand. 20 percent broken and abraded shell fragments. 10 percent gray silt and clay matrix, indurated. 5 percent dark-green medium-grained glauconite. Ostracoda and Foraminifera abundant.
125-137 Sand, gray; 75 percent fine to medium-grained subangular quartz sand. 20 percent gray silt and clay matrix, unconsolidated. 5 percent fine to medium-grained glauconite. Ostracoda and Foraminifera abundant.

Ostracoda from 17-137-feet include:
Cytherelloidea swaini Brown
Cytheridea (Haplocytheridea) fabaformis (Berry)
Brachycythere rhomboidalis (Berry)
Alatacythere alata atlantica (Schmidt)
Trachyleberis pidgeoni (Berry)
Loxoconcha scraphae Brown
Velarocythere arachoides (Berry)

Upper Cretaceous—Black Creek formation (Snow Hill marl member)

137-153 Clay, black; 20 percent fine to very fine-grained angular quartz sand. 60 percent black micaceous clay matrix, unconsolidated, tight. 15 percent broken shell fragments. 5 percent black lignitized plant remains. Fine-grained glauconite prominent. Ostracoda common, Foraminifera rare.
153-163 Clay and sand, black; Same as 137-153-foot interval with 5 percent increase in percent of quartz sand. Ostracoda common, Foraminifera rare.
163-178 Clay and sand, black; Same as 153-163-foot interval with a slight increase in amount of black lignitized plant remains. Ostracoda and Foraminifera rare.
178-189 Clay and sand, black; Same as 163-178-foot interval. Ostracoda and Foraminifera rare.
189-203 Clay and sand, black; Same as 163-178-foot interval. Ostracoda and Foraminifera rare.
203-218 Clay and sand, black; 45 percent fine to very fine-grained angular quartz sand. 50 percent black clay matrix unconsolidated, tight. 5 percent light-green glauconite. Trace of lignitized plant remains. Shell fragments prominent. Ostracoda and Foraminifera rare.
218-228 Clay and sand, black; Same as 203-218-foot interval. Ostracoda and Foraminifera common.
238-253 Clay and sand, black; 35 percent fine to very fine-grained angular quartz sand. 60 percent black micaceous clay matrix, unconsolidated. 5 percent variable dark to light-green glauconite. Trace of shell fragments and marcasite aggregates. Ostracoda and Foraminifera rare.
253-262 Sand and clay, black; 55 percent very fine-grained angular quartz sand. 35 percent gray micaceous clay matrix, unconsolidated. 10 percent dark-green fine-grained glauconite. Ostracoda and Foraminifera very rare.
262-278 Sand and clay, black; Same as 253-262-foot interval with slight

increase in grain size of quartz sand, and with shell fragments prominent. Ostracoda very rare, Foraminifera rare.

Ostracoda from 137-278-feet include:
Cytheridea (Haploeytheridea) monmouthensis Berry
Brachyeythere nausiformis Swain
Brachyeythere sphenoides (Reuss)
Brachyeythere ledaforma (Israelsky)
Trachyleberis gapensis (Alexander)
Orthonotaeythere tarensis Brown
Orthonotaeythere hannai (Israelsky)

Upper Cretaceous—Black Creek formation (unnamed member)

278-282 Sand, gray; 80 percent medium-grained subangular to subrounded quartz sand. 20 percent black silt and clay matrix, unconsolidated. Trace of mica flakes. Dark-green fine-grained glauconite prominent. No microfossils.

282-288 Clay and sand, black; 30 percent fine to very fine-grained, angular quartz sand. 70 percent black and gray micaceous clay, unconsolidated. Trace of marcasite and dark-green glauconite. No microfossils.

288-318 Clay and sand, black; Same as 282-288-foot interval, slightly indurated, consolidated layers. No microfossils.

318-328 Clay and sand, black; 35 percent coarse to fine-grained angular poorly-sorted quartz sand. 65 percent black clay matrix, unconsolidated, tight. Black lignitized plant remains and marcasite aggregates prominent. *Gumbelina* sp. and *Anomalina* sp.

328-333 Sand, gray; 85 percent coarse to medium-grained subrounded to subangular quartz sand. 15 percent black clay matrix, unconsolidated. Marcasite aggregates prominent. Trace of dark-green fine-grained glauconite. No microfossils.

333-375 Sand, gray; Same as 328-333-foot interval. No microfossils.

375-379 No sample.

379-398 Sand and clay, gray; 70 percent medium to coarse-grained subrounded quartz sand. 30 percent gray silt and clay matrix, unconsolidated. Trace of glauconite and pyrite aggregates. *Globigerina* sp.

398-405 Clay, black; 20 percent fine-grained angular to subangular quartz sand. 80 percent black micaceous clay matrix, unconsolidated. Lignitized plant remains common. Trace of dark-green glauconite and marcasite aggregates. *Gumbelina* sp. and *Globigerina* sp.

405-451 Sand, gray; 90 percent coarse to medium-grained feldspathic subrounded quartz sand. 10 percent black silt and clay matrix, unconsolidated. Trace of glauconite. No microfossils.

451-460 No sample.

460-478 Sand, gray; Same as 405-451-foot interval. No microfossils.

486-503 Sand, gray; Same as 405-451-foot interval. *Globigerina* sp.

503-523 Clay, gray: 15 percent fine to very fine-grained angular quartz sand. 80 percent black clay matrix, moderately indurated. 5 percent dark-green fine-grained glauconite. Hematite-stained quartz grains very prominent. No microfossils.

Foraminifera occurring in the interval designated as Black Creek formation (unnamed number) which extends from 278- to 523-feet include:
Globigerina sp.
Gumbelina sp.
Anomalina sp.

Upper Cretaceous—Tuscaloosa formation (?)

531-541 Sand, white; 95 percent coarse to medium-grained subrounded well-sorted quartz sand with frosted grains predominant. 5 percent white clay matrix. Hematite staining of sand grains less than 1 percent. No microfossils.

541-563 Sand and clay, red: 50 percent coarse to fine-grained subangular poorly-sorted quartz sand. 10 percent blocky potash feldspar grains. 40 percent red silt and clay matrix, unconsolidated. tight. Mica flakes prominent. No microfossils.

563-583 Sand and clay, red; Same as 541-563-foot interval. No microfossils.

Lenoir County

Number 3

Location: 1.5 miles west of Grifton, North Carolina.
Owner: E. I. DuPont de Nemours
Date drilled: 1955
Driller: Heater Well Co.
Elevation of well; 53.3 feet above sea level

Hydrologic Information

Diameter of well: 12 inches
Depth of well: 687 feet
Cased to: 687 feet
Static (nonpumping) water level: 47 feet below land surface
Yield: 1,000 gallons a minute with a drawdown of 52 feet

Log of Well

Depth (feet)

0-4 No sample

Upper Cretaceous—Peedee formation

4-6 Shale, light-gray; Very hard slightly-sandy shale. Trace of dark-green glauconite and euhedral pyrite crystals. No Ostracoda, Foraminifera common.

6-14 Shale, light-gray; Same as 4-6-foot interval. No Ostracoda, Foraminifera common.

14-24 Shale, light-gray; Same as 4-6-foot interval. No Ostracoda, Foraminifera common.

24-28 Shale, light-gray; Same as 4-6-foot interval. No Ostracoda, Foraminifera common.

28-32 Shale, light-gray; Same as 4-6-foot interval. No Ostracoda, Foraminifera very rare.

32-43 Sand, gray; 70 percent coarse to medium-grained subrounded to subangular quartz sand. 20 percent gray calcareous clay matrix, indurated in streaks. 10 percent dark-green medium-grained glauconite. Black phosphate pebbles prominent. Ostracoda and Foraminifera very rare.

43-49 Sand, gray; Same as 32-43-foot interval. Ostracoda and Foraminifera very rare.

49-53 Sand, gray; 85 percent coarse-grained subangular quartz sand. 10 percent gray clay matrix, unconsolidated. 5 percent dark-green coarse-grained glauconite. Trace of pyrite aggregates. Ostracoda and Foraminifera very rare.

53-59 Glauconitic sand, dark-green; 55 percent coarse to fine-grained subangular to angular quartz sand. 20 percent gray clay and silt matrix, unconsolidated. 25 percent dark-green medium-grained glauconite. Ostracoda and Foraminifera very rare.

59-68 Glauconitic sand, "salt and pepper", 55 percent medium to fine-grained subrounded to subangular quartz sand. 15 percent gray clay and silt matrix, unconsolidated. 30 percent dark-green medium-grained glauconite. Trace of broken shell fragments. Ostracoda and Foraminifera very rare.

68-84 Glauconitic sand, "salt and pepper"; Same as 59-68-foot interval with a 10 percent increase in glauconite and a 10 percent decrease in quartz sand. Ostracoda and Foraminifera rare.

84-90 Glauconitic sand, "salt and pepper"; Same as 68-84-foot interval. Ostracoda and Foraminifera rare.

90-94 Glauconitic sand, light-gray; 45 percent medium to fine-grained subrounded to subangular quartz sand. 25 percent dark-green fine-grained glauconite. 25 percent gray calcareous silt and clay matrix, indurated. 5 percent broken abraded shell fragments. Ostracoda and Foraminifera rare.

94-105 Sand, gray; 75 percent medium-grained subrounded to subangular quartz sand. 20 percent gray silt and clay matrix, unconsolidated. 5 percent dark-green fine-grained glauconite. Broken abraded shell fragments prominent. Ostracoda and Foraminifera rare.

105-125 Sand, gray; Same as 94-105-foot interval, indurated in streaks. Ostracoda and Foraminifera rare.

125-128 Sand and shell, gray; 50 percent medium to fine-grained angular quartz sand. 40 percent coarse abraded shell fragments. 10 percent gray calcareous clay matrix, indurated. Trace of dark-green glauconite and pyrite aggregates. Ostracoda and Foraminifera very rare.

128-143 Sand, gray: 80 percent medium to fine-grained subrounded to angular quartz sand. 20 percent gray clay matrix, unconsolidated. Trace of dark-green glauconite and broken shell fragments. Ostracoda and Foraminifera common.

Ostracoda from the 32-143-foot interval include:
Cytherelloidea swaini Brown
Cytherelloidea (?) *euneiforma* Brown
Cytheridea (Haplocytheridea) Carolinensis Brown
Cytheridea (Haplocytheridea) punctura (Schmidt)
Brachyeythere rhomboidalis (Berry)
Brachyeythere plena Alexander
Trachyleberis gapensis (Alexander)
Velarocythere arachoides (Berry)

Upper Cretaceous—Black Creek formation (Snow Hill marl member)

143-153 Sand and clay, dark-gray; 65 percent very fine to fine-grained angular quartz sand. 30 percent gray clay matrix, unconsolidated. 5 percent dark-green very fine-grained glauconite. Chalky broken shell fragments prominent. Trace of mica flakes and pyrite aggregates. *Inoceramus* prisms and otoliths. Ostracoda and Foraminifera common.

153-163 Sand and clay, dark-gray; Same as 143-153-foot interval. *Inoceramus* prisms and otoliths. Ostracoda and Foraminifera common.

163-178 Clay and sand, black; 35 percent very fine-grained angular quartz sand. 60 percent black micaceous clay matrix, unconsolidated but very compact. 5 percent broken shell fragments. Trace of dark-green glauconite and black lignitized wood fragments. *Inoceramus* prisms and otoliths prominent. Ostracoda and Foraminifera abundant.

178-183 Sand and clay, dark-gray; 70 percent very fine-grained angular quartz sand. 20 percent gray micaceous silt and clay matrix, unconsolidated. 5 percent dark-green very fine-grained glauconite. *Inoceramus* prisms prominent. Ostracoda and Foraminifera common.

184-193 Clay and sand, black; 35 percent very fine-grained angular quartz sand. 65 percent black micaceous clay matrix, unconsolidated but very compact. Trace of dark-green glauconite, black phosphate pebbles, black lignitized wood fragments, and white chalky shell fragments. *Inoceramus* prisms and otoliths. Ostracoda and Foraminifera common.

193-203 Clay and sand, black; Same as 184-193-foot interval. Ostracoda and Foraminifera common.

203-210 Clay and sand, black; Same as 184-193-foot interval, with dark-green fine-grained glauconite replacing 10 percent of the clay component. Ostracoda and Foraminifera rare.

210-221 Clay and sand, black; Same as 203-210-foot interval. Ostracoda and Foraminifera common.

221-228 Clay and sand, black; Same as 203-210-foot interval. Ostracoda and Foraminifera common.

228-244 Clay and sand, black; Same as 203-210-foot interval with a slight increase in amount of shell fragments. Ostracoda and Foraminifera rare.

244-253 Sand and clay, black; 60 percent medium to fine-grained subrounded to angular quartz sand. 35 percent black micaceous clay and silt matrix, unconsolidated. 5 percent dark-green fine-grained glauconite. Trace of chalky shell fragments and pyrite aggregates. *Inoceramus* prisms. Ostracoda and Foraminifera very rare.

253-260 Sand and clay, black; Same as 244-253-foot interval. Ostracoda and Foraminifera very rare.

260-266 Sand and clay, black; Same as 244-253-foot interval. Ostracoda and Foraminifera rare.

266-278 Clay and sand, black; 35 percent very fine-grained angular quartz sand. 60 percent black micaceous clay matrix, unconsolidated but very compact. 5 percent light-green fine-grained glauconite. Black lignitized wood fragments prominent. Trace of acicular gypsum and marcasite aggregates. Ostracoda and Foraminifera rare.

278-285 Sand, dark-gray; 85 percent medium-grained subangular to angular quartz sand. 15 percent dark-gray micaceous clay matrix, unconsolidated. Trace of light-green glauconite black lignitized wood fragments and marcasite aggregates. Ostracoda and Foraminifera common.

Ostracoda from the 143-285-foot interval include:

Cytherella bullata Alexander
Cytheridea (Haplocytheridea) monmouthensis Berry
Cythropteron (Eocytheropteron) striatum Brown
Brachycythere nausiformis Swain
Brachycythere sphenoides (Reuss)
Brachycythere ledaforma (Israelsky)
Trachyleberis gapensis (Alexander)
Orthonotacythere tarensis Brown
Orthonotacythere sulcata Brown
Protocythere paratriplicata Swain

Upper Cretaceous—Black Creek formation (unnamed member)

285-297 Clay and sand, mottled-yellow and gray; 35 percent fine to medium-grained angular to subangular quartz sand. 65 percent gray and yellow micaceous clay matrix, unconsolidated but very compact. Trace of glauconite and black lignitized wood fragments. No microfossils.

297-303 Clay and sand, dark-gray; 25 percent very fine to fine-grained angular quartz sand. 75 percent gray micaceous clay matrix, unconsolidated but very compact. Black lignitized wood fragments prominent. Trace of glauconite abraded shell fragments and marcasite aggregates. No microfossils.

303-311 Clay and sand, dark-gray; Same as 297-303-foot interval. No Ostracoda, Foraminifera very rare.

311-316 Sand and clay, gray; 75 percent medium-grained subangular to subrounded quartz sand. 25 percent gray micaceous clay matrix, unconsolidated. Trace of glauconite marcasite aggregates and black lignitized plant fragments. No microfossils.

316-322 Sand and clay, gray; Same as 311-316-foot interval. No microfossils.

322-328 Sand, gray; 90 percent medium to coarse-grained subangular to subrounded quartz sand. 10 percent gray micaceous clay matrix, unconsolidated. Trace of dark-green glauconite and black lignitized wood fragments. No Ostracoda, Foraminifera rare.

328-337 Sand, gray; Same as 322-328-foot interval. No microfossils.

337-348 Clay and sand, gray; 40 percent fine to medium-grained subangular to subrounded quartz sand. 60 percent gray micaceous clay matrix, unconsolidated but compact. Dark-green glauconite prominent. Trace of abraded shell fragments. No microfossils.

348-353 Sand, gray; 85 percent medium to fine-grained angular quartz sand. 15 percent gray micaceous clay matrix, unconsolidated. Dark-green glauconite prominent. Trace of abraded shell fragments. No Ostracoda, Foraminifera rare.

353-363 Sand, gray; Same as 348-353-foot interval. No microfossils.

363-373 Sand, gray; Same as 348-353-foot interval with decrease in grain size of quartz sand. No microfossils.

373-381 Sand and clay, gray; 70 percent fine-grained angular quartz sand. 30 percent gray micaceous clay matrix, unconsolidated but very compact. Dark-green glauconite and black lignitized wood fragments prominent. Trace of abraded shell fragments. No Ostracoda, Foraminifera rare.

381-388 Sand and clay, gray; Same as 373-381-foot interval with a 15 percent increase in the clay component. No microfossils.

388-394 Sand and clay, dark-gray; Same as 381-388-foot interval. Ostracoda rare, no Foraminifera.

394-405 Sand and clay, gray; 65 percent fine-grained angular quartz sand. 30 percent gray micaceous clay matrix, unconsolidated. 5 percent light-green fine-grained glauconite. Trace of abraded shell fragments. No microfossils.

405-415 Sand and clay, dark-gray; Same as 394-405-foot interval. No microfossils.

415-422 Sand and clay, dark-gray; Same as 394-405-foot interval. Ostracoda rare, no Foraminifera.

422-430 Clay and sand, black; 45 percent medium to fine-grained angular quartz sand. 55 percent black micaceous clay matrix, unconsolidated but very compact. Dark-green glauconite abraded shell fragments and black lignitized wood fragments prominent. No microfossils.

430-441 Sand and clay, dark-gray; 70 percent medium to coarse-grained subangular quartz sand. 30 percent gray micaceous clay matrix, unconsolidated. Black lignitized wood fragments prominent. Trace of dark-green glauconite and marcasite aggregates. No Ostracoda, Foraminifera rare.

441-453 Sand, gray; 85 percent coarse to medium-grained subrounded quartz sand. 15 percent gray micaceous silt and clay matrix, unconsolidated. Trace of light-green glauconite. No microfossils.

453-465 Sand, gray; Same as 441-453-foot interval. No microfossils.

465-474 Sand, gray; 75 percent coarse to fine-grained subrounded to angular quartz sand. 20 percent gray micaceous clay matrix, unconsolidated. 5 percent dark-green fine-grained glauconite. Black lignitized wood fragments and marcasite aggregates prominent. Trace of shell fragments. No microfossils.

474-478 Sand, gray; Same as 465-474-foot interval. No Ostracoda, Foraminifera rare.

478-488 Sand, gray; Same as 465-474-foot interval. No microfossils.

488-498 Sand, gray; Same as 465-474-foot interval. No microfossils.

498-503 Sand, gray; Same as 465-474-foot interval. No microfossils.

503-510 Sand, gray; Same as 465-474-foot interval. No microfossils.

510-523 Sand, gray; Same as 465-474-foot interval with a slight increase in clay matrix. No microfossils.

Ostracoda from the 285-523-foot interval are as follows:

388-394 *Brachycythere sphenoides* (Reuss)

415-422 *Brachycythere sphenoides* (Reuss)

Upper Cretaceous—Tuscaloosa formation

523-530 Sand and clay, gray to brown; 75 percent coarse to medium-grained subangular quartz sand. 25 percent gray to brown micaceous clay matrix. Red hematite aggregates and dark-green glauconite prominent. Trace of shell fragments and *Inoceramus* prisms. No microfossils.

530-542 Sand, gray; 80 percent medium-grained subangular to angular

quartz sand. 20 percent gray micaceous clay matrix, unconsolidated. Trace of dark-green glauconite. No microfossils.

542-551 Sand, gray to pink; 85 percent medium to fine-grained subangular to angular quartz sand. 15 percent gray to pink clay matrix, unconsolidated. Red hematite staining of quartz grains and hematite aggregates prominent. No microfossils.

551-558 Sand, pink; 80 percent medium to coarse-grained subrounded to subangular quartz sand. 15 percent mottled-pink to gray micaceous clay matrix. 5 percent red hematite aggregates. Trace of dark-green medium-grained glauconite. No microfossils.

558-563 Sand, pink; Same as 551-558-foot interval. No microfossils.

563-572 Sand, pink; Same as 551-558-foot interval. Ostracoda rare, no Foraminifera.

581-593 Sand, pink; Same as 551-558-foot interval. No microfossils.

593-603 Sand, yellow; 90 percent coarse to medium-grained subrounded to subangular quartz sand. 10 percent yellow waxy micaceous clay matrix, unconsolidated. No microfossils.

603-607 Sand, yellow; Same as 593-603-foot interval. No microfossils.

607-613 Sand, yellow; Same as 593-603-foot interval. No microfossils.

613-619 Sand, yellow; Same as 607-613-foot interval. No microfossils.

619-631 Clay and sand, red; 40 percent medium to fine-grained subrounded to angular quartz sand. 60 percent red micaceous clay and silt matrix, unconsolidated but compact. Red hematite aggregates prominent. Trace of dark-green glauconite. Ostracoda rare, no Foraminifera.

631-645 Sand and silt, red; 70 percent coarse to fine-grained angular poorly-sorted feldspathic quartz sand. 30 percent red silt and clay matrix, unconsolidated but compact. Red hematite aggregates prominent. Trace of dark-green glauconite. No microfossils.

645-652 Sand and silt, red. Same as 631-645-foot interval. No microfossils.

652-663 Sand and silt, yellow; Same as 631-645-foot interval with a color change as noted. No microfossils.

663-673 Sand and silt, yellow; Same as 652-663-foot interval. No microfossils.

673-680 No sample.

680-691 Sand and clay, tan; 70 percent medium to fine-grained angular quartz sand. 30 percent tan clay matrix, unconsolidated. Light-green fine-grained glauconite prominent. Trace of red hematite and marcasite aggregates. No microfossils.

691-703 Sand and clay, tan; Same as 680-691-foot interval. No microfossils.

703-708 Sand and clay, tan; Same as 680-691-foot interval with slight increase in clay content. No microfossils.

708-713 Sand and clay, tan; Same as 680-691-foot interval. No microfossils. Ostracoda from the 523-713-foot interval are as follows:

563-572 *Cythereis ornatissima* (Reuss)

619-631 *Cythereis ornatissima* (Reuss)

Lower Cretaceous—unnamed unit

713-723 Sand and clay, brown; 70 percent fine-grained angular quartz sand. 30 percent brown micaceous clay and silt matrix, unconsolidated but very compact. Trace of glauconite and red hematite aggregates. Ostracoda abundant, no Foraminifera.

723-733 Sand and clay, brown; Same as 713-723-foot interval. Ostracoda abundant, no Foraminifera.

733-743 Sand and clay, brown; Same as 713-723-foot interval. Ostracoda abundant, no Foraminifera.

743-746 Sand and clay, brown; Same as 713-723-foot interval. Ostracoda abundant, no Foraminifera.

746-813 Sand and clay, brown; 55 percent coarse to very fine-grained subrounded to angular quartz sand. 40 percent brown micaceous clay matrix, unconsolidated but very compact. 5 percent red hematite aggregates. Trace of dark-green medium-grained glauconite and broken shell fragments. Ostracoda abundant, no Foraminifera.

813-823 Sand and clay, brown; 60 percent coarse to very fine-grained subrounded to subangular quartz sand. 30 percent brown micaceous and silty-clay matrix, unconsolidated. Trace of dark-green glauconite and broken shell fragments. Ostracoda abundant, no Foraminifera.

Remarks: The log given is that of the test well drilled to a depth of 823 feet. The production well was finished in the same hole at a depth of 687 feet. Ostracoda from the unnamed Lower Cretaceous unit in this well indicate that the unit can be correlated with Trinity and pre-Trinity sediments as recognized in the Gulf Coast province. Lower Cretaceous Ostracoda from this and other water wells will be described and figured in a separate paper.

Lenoir County

Number 4

Location: 5 miles west of Loftins X Roads.
Owner: Unknown
Date drilled: 1953
Driller: Haskins Well Co.
Elevation of well: 64 feet above sea level

Hydrologic Information

Depth of well: 120 feet
Cased to: 120 feet
Static (nonpumping) water level: unknown
Yield: unknown

Log of Well

Depth (feet)

Post Cretaceous—undifferentiated

0-10 Sand, white; 80 percent fine to very fine-grained angular quartz sand. 10 percent rust-colored silt and clay matrix, unconsolidated. 5 percent coarse blocky grains of potash feldspar. No microfossils.

Upper Cretaceous—Peedee formation

10-40 Sand and clay, gray; 65 percent fine to medium-grained angular to subangular quartz sand. 35 percent gray silty-clay matrix, unconsolidated. Trace of light-green weathered glauconite. Ostracoda and Foraminifera common.

40-50 Sand, gray; 80 percent very fine to fine-grained angular quartz sand. 15 percent gray micaceous and calcareous silt and clay matrix, unconsolidated. 5 percent dark-green fine-grained glauconite. Ostracoda and Foraminifera abundant.

50-60 Sand, gray; Same as 40-50-foot interval. Ostracoda and Foraminifera abundant.

60-80 Sand and clay, gray; 75 percent very fine-grained angular quartz sand. 25 percent gray micaceous clay matrix, unconsolidated. Dark-green fine-grained glauconite prominent. Ostracoda and Foraminifera abundant.

80-100 Sand and clay, gray; Same as 60-80-foot interval. Ostracoda and Foraminifera abundant.

100-110 Sand, gray; 85 percent coarse to medium-grained subrounded to subangular quartz sand. 15 percent gray micaceous silt and clay matrix, unconsolidated. Dark-green medium-grained glauconite prominent. Ostracoda and Foraminifera abundant.

110-120 Sand, gray; Same as 100-110-foot interval. Ostracoda and Foraminifera abundant.

Ostracoda from the 10-120-foot interval include:
Cytherelloidea swaini Brown
Cytheridea (Haplocytheridea) fabaformis (Berry)
Eucytherura curta (Jennings)
Trachyleberis communis (Israelsky)
Trachyleberis pidgeoni (Berry)
Velarocythere arachoides (Berry)
Velarocythere cacumenata Brown

Lenoir County

Number 5

Location: Rouse Farm, 0.9 mile west of Albrittons, North Carolina, on a dirt road connecting N. C. Routes 11 and 55.
Owner: J. M. Rouse
Driller: D. Sutton
Date drilled: 1952
Elevation of well: 84 feet above sea level

Hydrologic Information

Diameter of well: 2 inches
Depth of well: 110 feet
Cased to: Unknown
Finish: open end
Static (nonpumping) water level: Unknown
Yield: Unknown

Log of Well

Depth (feet)	
0-15	No sample.
	Post-Miocene—surficial sands
15-35	Sand, tan; 65 percent medium to coarse-grained subrounded quartz sand. 15 percent potash feldspar. 20 percent tan silt and clay matrix, unconsolidated.
	Upper Cretaceous—Peedee formation
35-50	Sand and clay, gray; 60 percent fine-grained angular quartz sand. 35 percent gray silt and clay matrix, unconsolidated. 5 percent fine to medium-grained glauconite. Ostracoda and Foraminifera common.
50-110	Sand, "salt and pepper"; 70 percent fine-grained angular quartz sand. 10 percent gray silt and clay matrix, unconsolidated. 20 percent fine to medium-grained glauconite. Ostracoda and Foraminifera common.
	Ostracoda from 35-110-feet include: *Eucytherura curta* (Jennings) *Brachycythere rhomboidalis* (Berry) *Trachyleberis communis* (Israelsky) *Trachyleberis pidgeoni* (Berry)

Martin County

Number 1

Location: Williamston, North Carolina. Test well on south bank of Roanoke River about 800 yards below the drawbridge.
Owner: Town of Williamston
Date drilled: 1954
Driller: Layne Atlantic Co.
Elevation of well: 19 feet above sea level

No hydrologic information was recorded for this test hole. The following hydrologic information is given for a well drilled for the town of Williamston in 1941 at an elevation of 59.5 feet above sea level.
Diameter of well: 8 inches
Depth of well: 500 feet
Cased to: 500 feet
Finish: gravel wall and screens
Static (nonpumping) water level: 29 feet below land surface (1942)
Yield: 250 gallons a minute
Chemical analysis of water available

Log of Test Hole

Depth (feet)	
0-5	No sample
	Post-Miocene—surficial sand
5-15	Sand, tan; 85 percent coarse to medium-grained subrounded to subangular quartz sand. 10 percent tan to gray silt and clay matrix, unconsolidated. 5 percent coarse to medium-grained potash feldspar grains. Trace of ilmenite and coarse mica flakes. No microfossils.
	Upper Miocene—Yorktown formation
15-36	Marl, gray; 30 percent medium to fine-grained subangular quartz sand. 25 percent coarse broken shell fragments. 45 percent blue-gray clay matrix, unconsolidated but very compact. Ostracoda and Foraminifera common.
36-48	Marl, gray; Same as 15-36-foot interval. Ostracoda and Foraminifera common.
	Ostracoda from the 15-48-foot intervals include: *Leguminocythereis whitei* Swain *Puriana rugipunctata* (Ulrich and Bassler) *Orionina vaughani* (Ulrich and Bassler) *Hemicythere conradi* Howe and McGuirt *Loxoconcha purisubrhomboidea* Edwards *Cushmanidea ashermani* (Ulrich and Bassler)
	Paleocene—unnamed unit
48-95	Glauconitic sand, "salt and pepper"; 60 percent medium to coarse-grained subangular to subrounded quartz sand. 30 percent dark-green medium-grained glauconite. 10 percent gray clay and silt matrix, unconsolidated to moderately consolidated in layers. Fresh authigenic pyrite crystals and aggregates prominent. Trace of broken shell fragments and phosphate spherules. Ostracoda and Foraminifera abundant.
	Ostracoda from the 48-95-foot interval include: *Cytheridea (Clithrocytheridea) virginica* (Schmidt) *Brachycythere interrasilis* Alexander *Brachycythere* cf. *B. verrucosa* Harris and Jobe *Alatacythere lemnicata* (Alexander) *Trachyleberis bassleri* (Ulrich) *Trachyleberis communis aquia* (Schmidt) *Actinocythereis siegristae* (Schmidt) *Loxoconcha* cf. *L. corrugata* Alexander
	Upper Cretaceous—Peedee formation
95-118	Sand, gray; 80 percent coarse to medium-grained subangular abraded quartz sand. 15 percent gray clay and silt matrix, unconsolidated. 5 percent light-green fine-grained glauconite. Broken abraded shell fragments prominent. Ostracoda and Foraminifera abundant.
118-150	Clay and sand, black; 30 percent medium to fine-grained subrounded to subangular quartz sand. 60 percent black micaceous clay matrix, unconsolidated but compact. 5 percent fine to medium gravel well-rounded. 5 percent black lignitized wood and plant fragments. Broken, abraded shell fragments prominent. Ostracoda and Foraminifera abundant.
	Ostracoda from the 95-150-foot intervals include: *Cytherella herricki* Brown *Cytherelloidea swaini* Brown *Cytheridea (Haplocytheridea) monmouthensis* Berry *Cytherura glossensis* Brown *Trachyleberis pidgeoni* (Berry) *Velarocythere arachoides* (Berry)

Remarks: The washed residue indicates that one or more thin indurated sand and shell beds occur in the 118-150-foot interval. Without a drilling-time or close sample-spacing log it is not possible to determine the number or thickness of such beds.

Martin County

Number 2

Location: Harrison farm, 2.6 miles northeast of Beargrass, North Carolina, on an unnumbered county road connecting Beargrass and U. S. Route 17.
Owner: Bill Harrison
Date drilled: 1954
Driller: Magette Well Co.
Elevation of well: 88 feet above sea level

Hydrologic Information

Diameter of well: 4 inches to 2 inches
Depth of well: 311 feet
Cased to: 311 feet
Finish: screens
Static water level: 40 feet below land surface (1955)
Yield: 60 gallons a minute

Log of Well

Depth (feet)	
	Post-Miocene—surficial sands
0-22	No sample.
22-63	Sand, white; 80 percent medium to fine-grained subangular to angular quartz sand. 15 percent tan silt and clay matrix, unconsolidated. 5 percent white coarse-grained potash feldspar. Trace of fine-grained ilmenite. Limonitic staining of quartz and feldspar grains prominent.
	Upper Miocene—Yorktown formation
63-70	Sand, gray; 95 percent coarse to medium-grained subrounded to subangular quartz sand. 5 percent blue-gray clay matrix, unconsolidated. Trace of coarse broken abraded shell fragments. Ostracoda rare, Foraminifera common.
70-105	Marl, gray; 40 percent coarse to medium-grained subangular quartz sand. 35 percent coarse broken abraded shell fragments. 25 percent blue-gray clay matrix, unconsolidated. No Ostracoda, Foraminifera rare.
105-185	Marl, gray; Same as 70-105-foot interval. Ostracoda rare, Foraminifera common.

Ostracoda from the 63-70- and 105-185-foot intervals include:
Hemicythere conradi Howe and McGuirt
Loxoconcha purisubrhomboidea Edwards
Basslerites cf. *B. giganticus* Edwards

Paleocene—unnamed unit

185-195 Glauconitic sand, "salt and pepper"; 45 percent medium to fine-grained subangular quartz sand. 25 percent dark-green medium-grained glauconite. 30 percent gray clay matrix, unconsolidated but compact. Trace of broken abraded shell fragments and black phosphate spherules. No Ostracoda, Foraminifera very rare.

No Ostracoda were recovered from the 185-195-foot interval. Foraminifera include:
Anomalina vulgaris (Plummer)
Vaginulina midwayana Fox and Ross
Vaginulina plumoides Plummer

Upper Cretaceous—Peedee formation

195-276 Silt and sand, dark-gray; 35 percent fine to very fine-grained angular quartz sand. 60 percent dark-gray micaceous silt and clay matrix, unconsolidated but very compact. 5 percent dark-green fine-grained glauconite. Broken chalky shell fragments prominent. Trace of black lignitized wood fragments. Ostracoda rare, Foraminifera common.

Ostracoda from the 195-276-foot interval include:
Cytherelloidea andrewsi Brown
Cytheridea (Haplocytheridea) plummeri Alexander
Cytheridea (Haplocytheridea) monmouthensis Berry
Brachycythere rhomboidalis (Berry)
Alatacythere alata atlantica (Schmidt)

Martin County

Number 3

Location: Jamesville, North Carolina, 0.2 mile east of Jamesville on U. S. Route 64.
Owner: Warren Cherry
Date drilled: 1952
Driller: Hudson Well Co.
Elevation of well: 47 feet above sea level

Hydrologic Information

No information is available for this well. The following information is given for a nearby well which is just above river level at an elevation of 14 feet and owned by I. T. Hardison of Jamesville, North Carolina.
Diameter of well: 2 inches
Depth of well: 95 feet
Cased to: 95 feet
Finish: open end
Static (nonpumping) water level: 21 feet above sea level, which is 7 feet above land surface (1954)
Yield: 12 gallons a minute (flow) 1954

Log of Well

Depth (feet)

Post-Miocene—surficial sands and clays

0-20 Sand and clay, gray; 75 percent coarse to fine-grained subrounded to angular poorly-sorted quartz sand. 25 percent gray micaceous clay matrix, unconsolidated.

20-30 Sand and clay, gray; Same as 0-20-foot interval. No microfossils.

30-40 Sand, tan to gray; 85 percent coarse to medium-grained subrounded to subangular quartz sand. 15 percent tan to gray clay matrix, unconsolidated. Limonitic staining of quartz grains prominent.

Upper Miocene—Yorktown formation

40-50 Marl, gray; 40 percent medium to fine-grained subangular to angular quartz sand. 25 percent fresh broken shell fragments. 30 percent blue-gray clay matrix, unconsolidated. 5 percent dark-green medium-grained glauconite. Ostracoda and Foraminifera common.

50-75 Marl, gray; Same as 40-50-foot interval. Ostracoda and Foraminifera common.

75-95 Sand, light-gray; 80 percent medium to very fine-grained subangular to angular quartz sand. 20 percent blue-gray clay matrix, unconsolidated. Broken shell fragments prominent. Trace of dark-green glauconite and black phosphate grains. Ostracoda and Foraminifera very rare.

95-120 Sand, light-gray; Same as 75-95-foot interval. Ostracoda and Foraminifera very rare.

Ostracoda from the 40-95-foot intervals include:
Puriana rugipunctata (Ulrich and Bassler)
Actinocythereis exanthemata (Ulrich and Bassler)
Loxoconcha purisubrhomboidea Edwards
Cushmanidea ashermani (Ulrich and Bassler)

Middle Miocene(?)—unnamed units

120-135 Phosphatic sand, brown; 55 percent fine to medium-grained subangular water-polished quartz sand. 25 percent brown collophane spherules and shards. 20 percent gray to brown silt and clay matrix, unconsolidated. Broken shell fragments prominent. No microfossils.

Middle Eocene—lower part of Castle Hayne limestone

135-145 Shell limestone, light-gray; 10 percent medium to fine-grained subangular quartz sand. 55 percent broken shell fragments. 30 percent calcareous matrix, well consolidated and very hard. 5 percent dark-green fine-grained glauconite. No microfossils.

145-160 Shell limestone, light-gray; Same as 135-145-foot interval. No microfossils.

Remarks: The intervals designated as middle Miocene(?) and the lower part of the Castle Hayne limestone are correlated on the basis of lithology and stratigraphic position. On the basis of evidence from nearby wells and auger holes it is suggested that the Yorktown-middle Miocene contact in this area lies somewhat higher than is shown in this well. Both the middle Miocene and Castle Hayne have not been recognized north of Jamesville, North Carolina. Both units thicken towards the southeast and are very extensive in Beaufort County.

New Hanover County

Number 1

Location: Stratigraphic test hole at the town of Wrightsville Beach, North Carolina.
Owner: Town of Wrightsville Beach
Date drilled: 1953
Driller: Layne Atlantic Co.
Elevation of well: 5 feet above sea level

Hydrologic Information

No single well furnishes hydrologic information which could be considered as average for the area in and around Wrightsville Beach.

Log of Test Hole

Depth (feet)

Post-Miocene—beach gravels and marls

0-10 Beach gravel, tan; 55 percent fine to medium rounded gravel; 45 percent broken angular to rounded shell fragments. No discernable matrix.

10-23 Beach gravel, tan; Same as 0-10-foot interval.

23-35 Beach gravel, tan; 40 percent fine to medium rounded to subrounded gravel. 60 percent broken angular to subrounded shell fragments. No discernable matrix.

35-43 Marl, dark-gray; 20 percent coarse to fine-grained subrounded to subangular quartz sand. 55 percent coarse broken abraded shell fragments. 25 percent gray clay and silt matrix, unconsolidated. No Ostracoda, Foraminifera rare.

43-55 Marl, dark-gray; 30 percent fine to very fine-grained angular to subangular quartz sand. 20 percent chalky shell fragments. 50 percent gray clay and silt matrix, indurated and loosely consolidated. No Ostracoda, Foraminifera rare.

55-69 Marl, dark-gray; Same as 43-55-foot interval with slight increase in percentage of quartz sand. No Ostracoda, Foraminifera rare.

Upper(?) Eocene—upper part of Castle Hayne limestone

69-81 Shell limestone, gray; 10 percent fine-grained angular quartz sand. 70 percent broken shell fragments, coral forms predominant. 20 percent calcareous matrix, indurated and moderately hard with partial recrystallization of the shell fragments. Ostracoda and Foraminifera rare.

81-85 Shell limestone, gray; Same as 69-81-foot interval. Ostracoda rare, Foraminifera common.

85-94 Shell limestone, gray; Same as 69-81-foot interval. Ostracoda and Foraminifera common.

94-107 Shell limestone, gray; Same as 69-81-foot interval. Ostracoda and Foraminifera common.

107-118 Shell limestone, light-gray; 15 percent medium to fine-grained subangular quartz sand. 50 percent broken recrystallized shell fragments. 35 percent calcareous matrix, indurated. Dark-green weathered glauconite prominent. Ostracoda and Foraminifera common.

Ostracoda occurring in the 69-107-foot intervals include:
Cytherella sp. B.
Cytherelloidea danvillensis Howe var.
Trachyleberis sps. A, B, and C.
Cytheretta alexanderi Howe and Chambers

Upper Cretaceous—Peedee formation

118-122 Calcareous sand and clay, dark-gray; 55 percent fine to very fine-grained angular quartz sand. 35 percent calcareous clay matrix, indurated and moderately hard. 10 percent fine broken-limestone fragments. Dark-green fine to medium-grained glauconite prominent. Ostracoda and Foraminifera rare.

122-127 Calcareous sand and clay, dark-gray; Same as 118-122-foot interval but slightly more consolidated. Ostracoda and Foraminifera very rare.

127-141 Sand, dark-gray; 85 percent fine to medium-grained angular to subangular quartz sand. 15 percent gray calcareous clay matrix, unconsolidated. Trace of dark-green fine-grained glauconite. Fine broken shell fragments prominent. Ostracoda and Foraminifera common.

141-160 Sand and clay, dark-gray; 65 percent very fine to fine-grained angular quartz sand. 35 percent gray silt and clay matrix, unconsolidated. Dark-green fine-grained glauconite and broken shell fragments common. Ostracoda and Foraminifera rare.

160-166 Calcareous sand, gray; 65 percent coarse to medium-grained subrounded to subangular quartz sand. 25 percent calcareous clay matrix, indurated and well consolidated. 10 percent broken shell fragments. Trace of dark-green medium-grained glauconite. Ostracoda and Foraminifera rare.

166-177 Sand and shell, gray; 45 percent coarse to medium-grained subrounded to subangular quartz sand. 40 percent coarse broken shell fragments. 15 percent calcareous clay matrix, indurated and very compact. Ostracoda and Foraminifera rare.

177-187 Calcareous sand, gray; Same as 160-166-foot interval. Ostracoda and Foraminifera common.

187-197 Calcareous sand, gray; Same as 160-166-foot interval with a slight increase in shell content. Ostracoda and Foraminifera common.

197-207 Sand, gray; 80 percent fine to very fine-grained angular quartz sand. 20 percent gray micaceous clay matrix, unconsolidated. Trace of fine-grained glauconite and phosphate. Broken shell fragments prominent. Ostracoda and Foraminifera common.

207-217 Sand, gray; Same as 197-207-foot interval. Ostracoda and Foraminifera common.

217-228 Sand, gray; Same as 197-207-foot interval. Ostracoda and Foraminifera common.

228-238 Sand, gray; Same as 197-207-foot interval. Ostracoda and Foraminifera common.

238-248 Sand, gray; Same as 197-207-foot interval. Ostracoda common, Foraminifera rare.

248-257 Sand, gray; Same as 197-207-foot interval. Ostracoda and Foraminifera common.

257-289 Sand, gray; Same as 197-207-foot interval. Ostracoda and Foraminifera rare.

289-310 Sand and clay, dark-gray; 60 percent fine to very fine-grained angular quartz sand. 40 percent gray clay matrix, unconsolidated. Dark-green glauconite prominent. Trace of black phosphate pebbles and broken shell fragments. Ostracoda and Foraminifera rare.

310-343 Sand and clay, dark-gray; Same as 289-310-foot interval. Ostracoda and Foraminifera rare.

343-351 Sand, gray; 85 percent coarse to medium-grained subrounded quartz sand. 15 percent gray clay matrix, unconsolidated. Dark-green medium-grained glauconite prominent. Trace of broken shell fragments and phosphate pebbles. Ostracoda and Foraminifera rare.

351-361 Sand, gray; Same as 343-351-foot interval with increase in glauconite. Ostracoda and Foraminifera rare.

361-371 Sand, gray; Same as 343-351-foot interval with glauconite increasing to 5 percent. Ostracoda and Foraminifera very rare.

371-380 Sand, gray; Same as 343-351-foot interval but with sand predominantly medium-grained. Ostracoda and Foraminifera very rare.

380-392 Sand, gray; Same as 371-380-foot interval. Ostracoda and Foraminifera very rare.

392-404 Sand, gray; Same as 371-380-foot interval. Ostracoda and Foraminifera very rare.

404-412 Sand and clay, dark-gray; 60 percent fine-grained angular quartz sand. 40 percent gray micaceous clay matrix, unconsolidated. Dark-green fine-grained glauconite prominent. Trace of fine broken shell fragments and phosphate pebbles. Ostracoda and Foraminifera very rare.

Ostracoda occurring in the 118-412-foot intervals include:
Cytheridea (Haplocytheridea) ulrichi (Berry)
Cytheridea (Haplocytheridea) monmouthensis Berry
Cytheridea (Haplocytheridea) councilli Brown
Eucytherura curta (Jennings)
Cytheropteron (Cytheropteron) penderensis Brown
Trachyleberis pidgeoni (Berry)

New Hanover County

Number 2

Location: Becker Building Supply Co., U. S. Route 17, 1 mile east of Wilmington.
Owner: Mr. Becker
Date drilled: 1953
Driller: Blake Well Co.
Elevation of well: 40 feet above sea level

Hydrologic Information

Diameter of well: 4 inches
Depth of well: 150 feet
Cased to: 105 feet
Static (nonpumping) water level: Unknown
Yield: 40 gallons a minute
Finish: open end

Log of Well

Depth (feet)

Post-Miocene—surficial sand

0-20 Sand, pink; 80 percent medium to fine-grained subangular quartz sand. 20 percent pink clay matrix, unconsolidated.

20-45 Clay and sand, light-gray; 40 percent very fine to medium-grained angular to subangular poorly-sorted quartz sand. 60 percent light-gray clay matrix, unconsolidated but very compact. Trace of fine-grained mica flakes.

Upper(?) Eocene—upper part of Castle Hayne limestone

45-55 Shell limestone, white; 15 percent medium to fine-grained subangular quartz sand. 60 percent coarse broken shell and limestone fragments. 25 percent soft calcareous matrix, loosely consolidated.

55-65 Shell limestone, white; Same as 45-55-foot interval, but well indurated and partially recrystallized. Trace of dark-green glauconite and black phosphate grains. Ostracoda rare, Foraminifera common.

65-80 Shell limestone; Same as 55-65-foot interval. Ostracoda very rare, Foraminifera rare.

Ostracoda from the 45-65-foot interval include:
Cytherelloidea sp. *A*.
Bairdia sp. *B* .
Cytherura sp. *B*.
Trachyleberis sps. *A*. and *B*.
Loxoconcha sp. *A*.
Cytheretta alexanderi Howe and Chambers

Upper Cretaceous—Peedee formation

80-100 Sand and clay, gray; 70 percent fine to very fine-grained angular quartz sand. 30 percent gray micaceous clay matrix, unconsolidated. Trace of chalky broken shell fragments. Ostracoda and Foraminifera very rare.

Ostracoda occurring in the 80-100-foot interval are:
Cytheridea (Haplocytheridea) fabaformis (Berry)
Eucytherura curta (Jennings)
Orthonotacythere hannai (Israelsky)

New Hanover County

Number 3

Location: Wilmington, North Carolina, 205 Floral Parkway.
Owner: Mr. Yopp
Date drilled: 1953
Driller: Blake Well Co.
Elevation of well: 25 feet above sea level

Hydrologic Information

Diameter of well: 6 inches to 4 inches
Depth of well: 135 feet
Cased to: 100 feet
Finish: open end
Static (nonpumping) water level: 2 feet below land surface (1955)
Yield: Unknown

Log of Well

Depth (feet)	
	Post-Miocene—surficial sand
0-9	No sample.
9-21	Sand, tan; 85 percent fine-grained angular well-sorted quartz sand. 15 percent tan clay matrix, unconsolidated. Trace of fine-grained ilmenite and coarse mica flakes. No microfossils.
21-25	Sand, tan; Same as 9-21-foot interval. No microfossils.
	Upper(?) Eocene—upper part of Castle Hayne limestone
25-45	Calcareous sand, white; 60 percent fine-grained angular water-polished quartz sand. 30 percent white shell and limestone fragments. 10 percent calcareous matrix, loosely consolidated. Trace of medium-grained glauconite and phosphate. Ostracoda common, Foraminifera abundant.
45-55	Shell limestone, gray; 15 percent fine to medium-grained angular to subangular quartz sand. 50 percent coarse broken shell and limestone fragments. 35 percent calcareous matrix, loosely consolidated. Ostracoda and Foraminifera rare.
	Ostracoda occurring in the 25-45-foot intervals include: *Bairdia* sp. *A.* *Trachyleberis montgomeryensis* (Howe and Chambers) *Trachyleberis* sps. *A.* and *B.* *Loxoconcha croolensis* Howe and Chambers *Cythcretta alexanderi* Howe and Chambers *Monoceratina alexanderi* Howe and Chambers
	Upper Cretaceous—Peedee formation
55-75	Sand and clay, dark-gray, 70 percent fine to very fine-grained angular quartz sand. 30 percent dark-gray micaceous clay matrix, unconsolidated but compact. Trace of chalky shell fragments. No Ostracoda, Foraminifera rare.
75-80	Sand, light-gray; 75 percent coarse to medium-grained subangular to subrounded quartz sand. 25 percent gray calcareous matrix, unconsolidated. Coarse to fine-grained phosphate spherules and shards prominent. Trace of coarse broken shell fragments. Ostracoda and Foraminifera rare.
80-90	Sand and clay, dark-gray; 75 percent fine to medium-grained angular to subangular quartz sand. 25 percent gray micaceous clay matrix, unconsolidated but compact. Medium-grained phosphate spherules and shards prominent. Trace of white chalky shell fragments. Ostracoda rare, Foraminifera common.
90-100	Clay and sand, gray; 35 percent very fine to fine-grained angular quartz sand. 65 percent gray micaceous clay and silt matrix, unconsolidated but very compact. Trace of white chalky shell fragments and medium-grained phosphate. Ostracoda rare, Foraminifera common.
100-115	Clay and sand, gray; Same as 90-100-foot interval. Ostracoda rare, Foraminifera common.
115-125	Sand, gray; 80 percent coarse to fine-grained subrounded to subangular quartz sand. 15 percent gray calcareous clay matrix, indurated and moderately consolidated. 5 percent dark-green medium-grained glauconite. Trace of phosphate pebbles and shell fragments. Ostracoda rare and Foraminifera common.
125-135	Sand, gray; Same as 115-125-foot interval. Ostracoda and Foraminifera common.
	Ostracoda occurring in the 55-125-foot intervals include: *Cytheridea (Haplocytheridea) ulrichi* (Berry) *Eucytherura curta* (Jennings) *Brachycythere raleighensis* Brown *Trachyleberis pidgeoni* (Berry)

New Hanover County

Number 4

Location: Clarendon Waterworks Company well in Hilton Park, Wilmington, North Carolina.
Owner: City of Wilmington
Date drilled: 1899
Driller: Unknown
Elevation of well: 9 feet above sea level

Hydrologic Information

Depth of well: 1,330 feet. Well abandoned because of excessive chloride.

Log of Well

Depth (feet)	
	Post-Cretaceous—surficial sands
0-10	Sand, dark-brown; 85 percent medium to fine-grained subangular to angular quartz sand. 15 percent brown silt and clay matrix, unconsolidated. Trace of dark-green glauconite. No Ostracoda, Foraminifera very rare.
	Upper Cretaceous—Peedee formation
10-20	Sand and clay, yellow to brown; 65 percent fine to very fine-grained angular quartz sand. 35 percent yellow-brown clay and silt matrix, unconsolidated but compact. Trace of fine mica flakes and dark-green glauconite. Limonitic staining of quartz grains prominent. No microfossils.
20-30	Sand, brown; 85 percent medium-grained subangular quartz sand. 15 percent brown silt and clay matrix, unconsolidated. Small red hematite aggregates prominent. Trace of fine mica flakes and dark-green glauconite. Hematite staining on quartz grains prominent. Ostracoda very rare, Foraminifera rare.
30-40	Calcareous sand, light-gray; 75 percent medium to fine-grained angular quartz sand. 25 percent gray calcareous silt matrix, indurated and well consolidated. Trace of light-green glauconite and broken shell fragments. Ostracoda and Foraminifera rare.
40-50	Sand, light-gray; 85 percent medium-grained angular to subangular quartz sand. 15 percent calcareous clay matrix, unconsolidated. Trace of fine-grained glauconite phosphate and broken shell fragments. Ostracoda and Foraminifera common.
50-60	Sand, light-gray; Same as 40-50-foot interval. Ostracoda and Foraminifera common.
60-70	Calcareous sand, gray; 65 percent medium to very fine-grained angular quartz sand. 35 percent partially recrystallized, calcareous clay matrix, indurated and well consolidated. Ostracoda and Foraminifera rare.
70-80	Sand, gray; 85 percent medium-grained subangular well-sorted quartz sand. 15 percent gray calcareous clay matrix, unconsolidated. Dark-green glauconite prominent. Trace of fine mica flakes, black phosphate grains and broken shell fragments. Ostracoda and Foraminifera common.
80-140	Sand and clay, dark-gray; 75 percent fine to very fine-grained angular quartz sand. 25 percent dark-gray micaceous clay matrix, unconsolidated but compact. Trace of dark-green glauconite black phosphate pebbles and broken shell fragments. Several thin indurated layers occur below 100 feet. Ostracoda and Foraminifera abundant.
140-200	Sand and clay, black; 60 percent very fine to fine-grained angular quartz sand. 40 percent black micaceous clay matrix, unconsolidated but very compact. Trace of dark-green glauconite and chalky shell fragments. Ostracoda and Foraminifera abundant.
200-210	Sand, light-gray; 80 percent medium to very fine-grained subangular to angular quartz sand. 20 percent gray micaceous clay matrix, unconsolidated. Trace of light-green glauconite and black phosphate pebbles. Ostracoda and Foraminifera abundant.
210-280	Sand and silt, black; 65 percent fine to very fine-grained angular quartz sand. 35 percent black micaceous silt and clay matrix, unconsolidated but very compact. Trace of light-green glauconite black phosphate pebbles and white chalky shell fragments. Ostracoda and Foraminifera common.
280-400	Sand, gray; 80 percent medium to fine-grained subrounded to angular quartz sand. 20 percent gray calcareous and micaceous clay matrix, unconsolidated to indurated in thin layers. Black lignitized wood fragments and broken shell fragments prominent. Trace of glauconite and acicular gypsum. Ostracoda and Foraminifera rare.
400-490	Sand and clay, dark-gray; 70 percent medium to fine-grained

subangular to angular quartz sand. 30 percent dark-gray micaceous clay and silt matrix, unconsolidated. Shell fragments and black lignitized wood fragments prominent. Trace of light-green glauconite. Ostracoda and Foraminifera common.

490-570 Sand, gray; 85 percent fine to medium-grained angular to subangular quartz sand. 15 percent gray micaceous clay matrix, unconsolidated. Broken shell fragments prominent. Trace of black lignitized wood fragments marcasite aggregates and glauconite Ostracoda and Foraminifera rare.

570-595 Glauconitic sand, "salt and pepper"; 55 percent fine to medium-grained subangular quartz sand. 25 percent dark-green fine-grained glauconite. 20 percent gray micaceous clay matrix, unconsolidated but compact. Small aggregates of fine-grained red sandstone prominent. Trace of broken shell fragments. Ostracoda very rare, no Foraminifera.

595-630 Sand and clay, dark-gray; 65 percent fine to very fine-grained angular quartz sand. 30 percent dark-gray micaceous clay and silt matrix, unconsolidated but very compact. 5 percent light-green fine-grained glauconite. Small aggregates of fine-grained red sandstone prominent. Trace of black, lignitized wood fragments and broken shell fragments. Ostracoda and Foraminifera very rare.

630-670 Glauconitic sand, "salt and pepper"; 45 percent fine-grained angular quartz sand. 25 percent dark-green fine-grained glauconite. 25 percent gray micaceous clay matrix, unconsolidated but compact. 5 percent brown phosphate spherules and shards. Small aggregates of fine-grained red sandstone prominent. Trace of broken shell fragments. Ostracoda and Foraminifera rare.

Ostracoda from the 20-360-foot intervals include:
Cytheridea (Haplocytheridea) ulrichi (Berry)
Cytheridea (Haplocytheridea) fabaformis (Berry)
Eucytherura curta (Jennings)
Cytheropteron (Eocytheropteron) straillis Brown
Brachycythere rhomboidalis (Berry)
Brachycythere raleighensis Brown
Trachyleberis communis (Israelsky)
Velarocythere scuffeltonensis Brown
Orthonotacythere hannai (Israelsky)

670-840 No sample.

Upper Cretaceous—Black Creek formation

840-900 Clay and sand, black; 30 percent very fine to fine-grained angular quartz sand. 55 percent black micaceous clay matrix, unconsolidated but very compact. 10 percent shell and shell fragments. 5 percent black lignitized wood fragments. Small aggregates of fine-grained red sandstone prominent. Trace of acicular gypsum and marcasite aggregates. Ostracoda and Foraminifera abundant.

Ostracoda from the 840-900-foot interval include:
Cytheropteron (Eocytheropteron) striatum Brown
Brachycythere nausiformis Swain
Brachycythere sphenoides (Reuss)
Brachycythere ledaforma (Israelsky)
Trachyleberis gapensis (Alexander)

900-1330 No sample.

Remarks: Samples from this well are available at 10-foot intervals. The present log reflects only the major lithologic breaks because of space limitations.

A log of this well, with fossil determinations by Dr. T. W. Stanton, was published in the North Carolina Geological and Economic Survey, vol. 3, pt. 1, p. 163-166. The Peedee-Black Creek contact was placed at 720 feet and material equivalent to the Black Creek formation, as presently classified, extended to 1,109 feet where granite was encountered.

The original samples from this well were deposited with the North Carolina State Museum. Unfortunately, in 1954, the museum moved to a new location and the samples between 670-840-feet and 900-1065-feet were temporarily misplaced or lost. A description of the remaining samples is given here because the volume containing the original log has been out of print for some time.

New Hanover County

Number 5

Location: Moffit Village of the Wilmington Housing Authority.
Owner: Wilmington Housing Authority
Date drilled: 1942
Driller: Heater Well Co.
Elevation of well: 23 feet above sea level

Hydrologic Information

Diameter of well: 10 inches
Depth of well: 175 feet
Cased to: 175 feet
Finish: slotted casing
Static (nonpumping) water level: 9 feet below land surface (1942)
Yield: Tested at 140 gallons a minute with a 36.6-foot drawdown

Log of Well

Depth (feet)

0-10 No sample.

Post-Miocene—surficial sands

10-15 Sand, white; 90 percent fine-grained subangular to subrounded quartz sand. 10 percent tan clay matrix, unconsolidated. Limonitic staining of quartz grains prominent. Quartz grains are predominantly frosted and etched. No microfossils.

15-21 Sand, white; Same as 10-15-foot interval. No microfossils.

21-39 Sand, white; 90 percent fine to coarse-grained subangular to rounded poorly-sorted quartz sand. 10 percent tan clay matrix, unconsolidated. Limonitic staining of quartz grains prominent. No microfossils.

39-45 Sand, white; Same as 21-39-foot interval with slight increase in percentage of coarse sand. No microfossils.

45-55 Sand, white; Same as 39-45-foot interval.

Upper(?) Eocene—upper part of Castle Hayne limestone

55-61 Sand, white; 75 percent coarse to medium-grained subrounded quartz sand. 15 percent tan silt and clay matrix, unconsolidated. 10 percent broken and abraded shell and limestone fragments. No microfossils.

61-70 Sand and clay, gray; 60 percent medium to fine-grained subrounded to subangular quartz sand. 30 percent gray clay and silt matrix, unconsolidated but compact. 10 percent shell and limestone fragments. No microfossils.

Upper Cretaceous—Peedee formation

70-73 Sandy limestone, light-gray; 25 percent medium-grained subrounded quartz sand. 65 percent gray limestone matrix, very hard. 10 percent dark-green medium-grained glauconite. Ostracoda and Foraminifera rare, very poorly preserved.

73-87 Sand and clay, gray; 75 percent fine-grained subangular quartz sand. 25 percent silt and clay matrix, indurated and hard. Ostracoda rare, Foraminifera very rare.

87-90 Sand and clay, gray; Same as 73- to 87-foot interval. Ostracoda and Foraminifera rare.

90-120 Glauconitic sand, "salt and pepper"; 55 percent fine-grained subangular quartz sand. 30 percent fine-grained dark-green glauconite. 15 percent gray silt and clay matrix, unconsolidated. Ostracoda rare, Foraminifera common.

120-130 Sand and clay, gray; 70 percent fine-grained angular quartz sand. 25 percent calcareous clay matrix, hard and well consolidated. 5 percent dark-green fine-grained glauconite. Ostracoda and Foraminifera rare.

130-140 Sand and clay, gray; Same as 120-130-foot interval. Ostracoda rare, Foraminifera common.

165-169 Sand, gray; 85 percent fine to very fine-grained angular quartz sand. 15 percent gray silt and clay matrix, indurated and loosely consolidated. Ostracoda and Foraminifera common.

169-175 Sand, gray; 80 percent fine-grained angular quartz sand. 20 percent gray silt and clay matrix, indurated and loosely consolidated. Ostracoda and Foraminifera common.

Ostracoda from 73-175-feet include:
Cytheridea (Haplocytheridea) fabaformis (Berry)
Cytheridea (Haplocytheridea) ulrichi Berry
Eucytherura curta (Jennings)
Brachycythere rhomboidalis (Berry)
Trachyleberis communis (Israelsky)

Remarks: The first Peedee Ostracoda occur in the 73- to 87-foot interval. The intervals between 55-and 73-feet are placed in the Castle Hayne limestone on the basis of lithology. No microfaunal evidence for the Castle Hayne limestone was found in the intervals examined.

New Hanover County

Number 6

Location: Well number 3 at Bluethenthal Bomber Base.
Owner: U. S. Army
Date drilled: 1942
Driller: Wilmington Pump and Well Co.
Elevation of well: 25 feet above sea level

Hydrologic Information

Diameter of well: 8 inches
Depth of well: 102 feet
Cased to: 96 feet
Finish: open end
Static (nonpumping) water level: 8 feet below land surface (1942)
Yield: Tested at 340 gallons a minute with a 9-foot drawdown (1942)

Log of Well

Depth (feet)	
0-10	No sample.
	Post-Miocene—surficial sands and clays
10-20	Clay and sand, tan; 30 percent fine-grained angular quartz sand. 70 percent tan clay matrix, unconsolidated. Limonitic staining of quartz grains prominent. No microfossils.
20-40	Sand and clay, tan; 75 percent medium to fine-grained subrounded to subangular quartz sand. 25 percent tan clay matrix, unconsolidated. Limonitic staining of quartz grains predominant.
	Upper Cretaceous—Peedee formation
40-50	Sand and clay, dark-gray; 65 percent medium to fine-grained subangular to angular quartz sand. 35 percent gray clay matrix, unconsolidated. Trace of dark-green glauconite. Ostracoda and Foraminifera very rare.
50-58	Clay, gray; 15 percent fine to very fine-grained angular quartz sand. 85 percent gray clay matrix, unconsolidated but very compact. Ostracoda and Foraminifera very rare.
58-70	Sand and clay, gray; 60 percent fine-grained subangular to angular quartz sand. 40 percent gray clay matrix, unconsolidated but compact. No Ostracoda, Foraminifera very rare.
70-80	Sand and clay, gray; Same as 58-70-foot interval. Ostracoda and Foraminifera rare.
	Ostracoda in the 40- to 80-foot intervals include: *Cytheridea (Haplocytheridea) plummeri* Alexander *Eucytherura curta* (Jennings) *Brachycythere* cf. *B. rhomboidalis* (Berry) *Trachyleberis communis* (Israelsky)
80-90	Calcareous sand and clay, light-gray; 65 percent fine to medium-grained subangular quartz sand. 35 percent calcareous clay matrix, indurated and hard. Trace of light-green glauconite. Ostracoda and Foraminifera very rare.
90-96	Calcareous sand and clay, light-gray; Same as 80-90-foot interval. Ostracoda and Foraminifera very rare.
96-102	Calcareous sand and clay, light-gray: Same as 80-90-foot interval. No Ostracoda, Foraminifera very rare.
102	Calcareous sand and clay, light-gray; Same as 80-90-foot interval. Ostracoda and Foraminifera very rare.

Remarks: The 40-50-foot interval contains several species of Eocene Ostracoda in addition to Late Cretaceous species. No lithologic or faunal evidence for the Castle Hayne limestone was encountered in samples above 40-feet. Presumably a thin zone of the Castle Hayne limestone is present at a depth of about 40-feet and the sampling was not fine enough to recover a representative sample.

Sample intervals below 80-feet contained only poorly preserved, recrystallized microfossils. No Ostracoda were identified from samples below 70-feet and the interval between 80-102-feet is correlated with the Peedee formation on the basis of stratigraphic position.

Onslow County

Number 1

Location: At Sears Landing on Topsail Beach, 2 miles east of Surf City.
Owner: U. S. Army (abandoned)
Date drilled: 1948
Driller: Blake Well Co.
Elevation of well: 5 feet above sea level

Hydrologic Information

Diameter of well: 8 inches to 4½ inches
Depth of well: 320 feet
Cased to: 320 feet
Finish: Screen
Static (nonpumping) water level: 3 feet above land surface (1948)
Yield: Flows at 4.5 gallons a minute (1948)

Log of Well

Depth (feet)	
0-10	No sample.
	Post-Miocene—beach sands and shell deposits
10-20	Sand and shell, tan; 60 percent coarse to fine-grained subrounded to subangular poorly-sorted quartz sand. 35 percent coarse broken abraded shell fragments. 5 percent tan clay and silt matrix, unconsolidated. Frosted and pitted surfaces on quartz grains predominant. No Ostracoda, Foraminifera very rare.
20-30	Sand and shell, tan; Same as 10-20-foot interval with addition of 5 percent well-rounded coarse gravel. No Ostracoda, Foraminifera rare.
30-40	Sand, tan; 75 percent coarse to fine-grained rounded to subangular quartz sand. 15 percent coarse broken shell fragments. 10 percent tan silt and clay matrix, unconsolidated. No Ostracoda, Foraminifera rare.
	Upper(?) Eocene—upper part of Castle Hayne limestone
40-50	Calcareous sand, light-gray; 75 percent fine to very fine-grained angular water-polished quartz sand. 20 percent broken cream-colored shell and limestone fragments. 5 percent calcareous clay matrix, loosely consolidated. Very fine-grained black phosphate prominent. Ostracoda and Foraminifera common.
50-60	Calcareous sand, light-gray; Same as 40-50-foot interval with increase in calcareous clay matrix. Ostracoda and Foraminifera rare.
60-70	Calcareous sand, light-gray; Same as 50-60-foot interval. Ostracoda and Foraminifera rare.
70-80	Calcareous sand, light-gray; Same as 50-60-foot interval. Ostracoda and Foraminifera rare.
80-100	Calcareous sand, light-gray; Same as 50-60-foot interval. Ostracoda and Foraminifera rare.
100-110	Calcareous sand, light-gray; Same as 50-60-foot interval. Ostracoda and Foraminifera common.
110-130	Calcareous sand, light-gray; Same as 50-60-foot interval. Ostracoda and Foraminifera common.
130-150	Dolomitic limestone, light-gray; 10 percent fine to medium-grained angular to subangular quartz sand. 90 percent dolomitic shell limestone, well consolidated and very hard. Ostracoda and Foraminifera very rare.
150-160	Dolomitic limestone, light-gray; Same as 130-150-foot interval but not as hard; chalky texture. Ostracoda and Foraminifera very rare.
160-170	Dolomitic limestone, light-gray; Same as 130-150-foot interval, very hard. Ostracoda and Foraminifera very rare.
170-187	Dolomitic limestone, light-gray; Same as 130-150-foot interval, chalky texture and slight increase in quartz sand. Ostracoda and Foraminifera very rare.
187-200	Dolomitic shell limestone, light-gray; 15 percent fine-grained angular quartz sand. 55 percent coarse dolomitized shells and shell fragments. 30 percent dolomitic limestone matrix, well consolidated and very hard but porous. Ostracoda and Foraminifera common.
	Ostracoda in samples from 40-187-feet include: *Trachyleberis montgomeryensis* (Howe and Chambers) *Trachyleberis broussardi* (Howe and Chambers) *Loxoconcha jacksonensis* Howe and Chambers *Loxoconcha creolensis* Howe and Chambers *Monoceratina alexanderi* Howe and Chambers
	Lower Eocene—unnamed unit
200-210	Calcareous sand, gray; 65 percent fine-grained subangular quartz sand. 30 percent calcareous clay matrix, loosely consolidated. 5 percent broken shell and limestone fragments. Ostracoda very rare, Foraminifera common.
210-211	Calcareous sand, gray; Same as 200-210-foot interval. Ostracoda very rare, Foraminifera common.
211	Calcareous sand, white; Same as 200-210-foot interval, but unconsolidated, matrix has a chalky texture. Ostracoda rare, Foraminifera abundant. *Cytheridea (Clithrocytheridea) virginica* (Schmidt) *Brachycythere marylandica* (Ulrich) *Actinocythereis hilgardi* (Howe and Garrett)

Remarks: The interval designated as lower Eocene contains very few Ostracoda, but *Brachycythere marylandica* (Ulrich) is considered diagnostic by the writer.

Onslow County

Number 2

Location: On Bogue Sound, 1 mile south of N. C. Route 24 and east of Swansboro, North Carolina.
Owner: C. P. Maness
Date drilled: 1952
Driller: Blake Well Co.
Elevation of well: 20 feet above sea level

Hydrologic Information

Diameter of well: 2 inches
Depth of well: 100 feet
Cased to: 95 feet
Finish: open end
Static (nonpumping) water level: 18 feet below land surface (1955)
Yield: Unknown

Log of Well

Depth (feet)	
0-10	No sample.
	Post-Miocene—surficial sand
10-20	Sand, light-gray; 80 percent fine to very fine-grained angular quartz sand. 20 percent gray silt and clay matrix, unconsolidated. Trace of very fine-grained ilmenite. Limonitic staining of quartz grains prominent. No microfossils.
	Upper Miocene—Yorktown formation
20-30	Marl, dark-gray; 35 percent coarse to medium-grained subrounded to subangular quartz sand. 25 percent coarse to fine broken abraded shell fragments. 40 percent gray clay matrix, unconsolidated. Ostracoda and Foraminifera common.
30-40	Marl, dark-gray; Same as 20-30-foot interval with slight decrease in sand content. Ostracoda and Foraminifera common.
50-60	Marl, dark-gray; Same as 20-30-foot interval. Ostracoda and Foraminifera common.
60-70	Marl, dark-gray; Same as 20-30-foot interval. Ostracoda and Foraminifera abundant.
70-80	Marl, light-gray; 15 percent medium to fine-grained subangular to angular quartz sand. 65 percent coarse broken shell fragments. 20 percent gray clay matrix, unconsolidated. Ostracoda and Foraminifera common. Ostracoda from the 20-80-foot intervals include: *Cytherura elongata* Edwards *Puriana rugipunctata* (Ulrich and Bassler) *Actinocythereis exanthemata* (Ulrich and Bassler) *Cytheretta reticulata* Edwards *Cushmanidea ashermani* (Ulrich and Bassler)
	Upper(?) Eocene—upper part of Castle Hayne limestone
80-90	Sandy limestone, gray; 40 percent fine to medium-grained subangular quartz sand. 60 percent gray limestone matrix, hard and well consolidated. Small phosphate pebbles prominent. Ostracoda and Foraminifera common.
90-100	Sandy limestone, gray; Same as 80-90-foot interval. Ostracoda and Foraminifera common. Ostracoda from the 80-90-foot intervals include: *Cytheridea (Clithrocytheridea) caldwellensis* Howe and Chambers *Brachycythere watervalleyensis* Howe and Chambers *Trachyleberis* sps. *B.* and *C.* *Loxoconcha jacksonensis* Howe and Chambers *Monoceratina alexanderi* Howe and Chambers

Onslow County

Number 3

Location: Jacksonville, North Carolina in Camp Lejeune just south of N. C. Route 24 at bridge crossing over Northeast Creek.
Owner: Rural Electrification Authority
Date drilled: 1941
Driller: C. W. Laumon Co.
Elevation of well: 22 feet above sea level

Hydrologic Information

Diameter of well: 8 inches
Depth of well: 588 feet
Cased to: 253 feet
Finish: screens
Static (nonpumping) water level: 7 feet below land surface (1941)
Yield: Unknown

Log of Well

Depth (feet)	
0-58	No sample.
	Post-Miocene (?) surficial sand
58-73	Sand, white; 85 percent fine-grained angular quartz sand. 15 percent white clay matrix, unconsolidated. No microfossils.
	Upper(?) Eocene—upper part of Castle Hayne limestone
73-79	Sandy, shell limestone, white; 35 percent medium to fine-grained subrounded to subangular quartz sand. 25 percent broken partially-recrystallized shell fragments. 40 percent white calcareous matrix, well consolidated and hard. Ostracoda and Foraminifera very rare.
79-83	Calcareous sand, and clay, light-gray; 60 percent medium to fine-grained subrounded to subangular quartz sand. 35 percent calcareous clay matrix, moderately consolidated. 5 percent dark-green fine-grained glauconite. Trace of black phosphate grains. Ostracoda and Foraminifera very rare.
83-88	Sandy, shell limestone, white; 30 percent coarse to medium-grained subrounded water-polished quartz sand. 20 percent coarse broken recrystallized shell fragments. 50 percent white calcareous matrix, well consolidated and hard. Black phosphate pebbles prominent. Ostracoda and Foraminifera rare, recrystallized. Ostracoda from the 73-88-foot intervals include: *Cytherelloides danvillensis* Howe *var.* *Bairdia* sp. *B.* *Cytherura* sp. *B.* *Trachyleberis* sp. *A.* *Cytheretta alexanderi* Howe and Chambers
	Middle Eocene—lower part of Castle Hayne limestone
88-135	Calcareous sand and clay, light-gray; 75 percent fine-grained angular quartz sand. 25 percent calcareous clay matrix, moderately consolidated. Dark-green glauconite and black phosphate prominent. Ostracoda and Foraminifera rare.
135-199	Calcareous sand and clay, light-gray; Same as 88-135-foot interval with glauconite increasing to 5 percent. Ostracoda and Foraminifera rare.
199-225	Calcareous sand and clay, light-gray; Same as 135-199-foot interval. Ostracoda and Foraminifera rare.
225-253	Calcareous sand and clay, light-gray; Same as 135-199-foot interval. Ostracoda and Foraminifera rare.
253-273	Calcareous sand and clay, light-gray; Same as 135-199-foot interval. Ostracoda and Foraminifera rare. Ostracoda from the 88-253-foot intervals include: *Brachycythere martini* Murray and Hussey *Trachyleberis rukasi* (Gooch) *Pterygocythereis washingtonensis* Swain *Actinocythereis hilgardi* (Howe and Garrett) *Actinocythereis stenzeli* (Stephenson)
	Upper Cretaceous—Peedee formation
273-307	Clay and sand, dark-gray; 40 percent fine to very fine-grained angular quartz sand. 60 percent gray micaceous clay matrix, unconsolidated but compact. Trace of dark-green fine-grained glauconite and broken shell fragments. Ostracoda and Foraminifera very rare.
307-319	Clay and sand, dark-gray; Same as 273-307-foot interval. Ostracoda and Foraminifera very rare.
319-327	Calcareous sand, dark-gray; 75 percent fine-grained angular quartz sand. 25 percent gray calcareous clay matrix, indurated and well consolidated. Dark-green fine-grained glauconite prominent. Trace of broken shell fragments. No microfossils.
327-335	Sand, dark-gray; 80 percent medium to fine-grained angular quartz sand. 15 percent gray clay matrix, unconsolidated. 5 percent dark-green glauconite. Trace of fine mica flakes and broken shell fragments. Ostracoda and Foraminifera rare.
335-367	Sand, dark-gray; Same as 327-335-foot interval. Ostracoda and Foraminifera very rare.
367-388	Sand and clay, dark-gray; 70 percent fine to very fine-grained angular quartz sand. 30 percent gray clay matrix, unconsolidated. Trace of dark-green glauconite and fine mica flakes. Ostracoda and Foraminifera rare.

388-391 Sand, gray; 90 percent medium to fine-grained angular quartz sand. 10 percent gray clay matrix, unconsolidated. Broken and abraded shell fragments prominent. Trace of dark-green glauconite and black phosphate. Ostracoda and Foraminifera common.

Ostracoda from the 273-388-foot intervals include:
Cytherelloidea swaini Brown
Cytheridea (Haplocytheridea) ulrichi Berry
Alatacythere alata atlantica (Schmidt)
Trachyleberis communis (Israelsky)
Platycythercis costatana angula (Schmidt)
Velarocythere cikonata Brown
Velarocythere cacumenata Brown

Remarks: No samples are available below a depth of 391 feet.

Onslow County

Number 4

Location: Test hole at Camp Geiger Marine Base, Peterfield Point, about 2.5 miles southeast of Jacksonville, North Carolina.
Owner: U. S. Navy
Date drilled: 1952
Depth of well: 200 feet
Driller: Sydnor Well and Pump Co.
Elevation of well: 18.4 feet above sea level

Hydrologic Information

No information is available on this test hole. The following information is taken from a nearby well of comparable depth.
Diameter of well: 10 inches
Depth of well: 182 feet
Cased to: 107 feet
Finish: open end
Static (nonpumping) water level: 4 feet below land surface (1952)
Yield: 450 gallons a minute

Log of Test Hole

Depth (feet)

Post-Miocene—surficial sands

0-10 Sand, tan; 95 percent very fine-grained angular quartz sand. 5 percent tan clay matrix, unconsolidated. No microfossils.

10-21 Sand, tan; Same as 0-10-foot interval. No microfossils.

21-36 Sand, gray; 80 percent fine to medium-grained subangular to subrounded quartz sand. 20 percent gray micaceous clay matrix, unconsolidated. Trace of very fine-grained glauconite.

Upper Miocene—Yorktown formation(?)

36-46 Sandy, dolomitic shell limestone, light-gray; 45 percent fine to medium-grained subrounded to angular quartz sand. 30 percent coarse broken partially-recrystallized shell fragments. 25 percent calcareous and dolomitic matrix, hard and well consolidated but porous. Trace of phosphate pebbles. No microfossils.

46-56 Sandy, dolomitic, shell limestone, light-gray; Same as 36-46-foot interval. No microfossils.

Upper(?) Eocene—upper part of Castle Hayne limestone

56-60 Calcareous sand, gray; 80 percent medium to fine-grained subrounded to subangular quartz sand. 5 percent coarse broken abraded shell fragments. 15 percent calcareous and dolomitic matrix, hard and well consolidated. Phosphate nodules prominent. Ostracoda and Foraminifera very rare.

60-70 Calcareous sand, gray; Same as 56-60-foot interval with a 10 percent increase in shell fragments and a 10 percent decrease in quartz sand. Ostracoda and Foraminifera rare.

70-80 Calcareous sand, gray; Same as 60-70-foot interval. Ostracoda and Foraminifera rare.

80-92 Calcareous sand, gray; Same as 60-70-foot interval with slight increase in grain size of quartz sand. Ostracoda and Foraminifera rare.

92-100 Calcareous sand, dark-gray; 65 percent fine to medium-grained angular quartz sand. 35 percent gray calcareous clay matrix, unconsolidated. Trace of broken abraded shell fragments. Ostracoda and Foraminifera rare.

100-110 Calcareous sand, dark-gray; 70 percent very fine-grained angular quartz sand. 20 percent gray calcareous clay matrix, loosely consolidated. 10 percent fine broken shell fragments. Trace of very fine-grained glauconite. Ostracoda and Foraminifera rare.

110-120 Calcareous sand, dark-gray; Same as 100-110-foot interval. Ostracoda and Foraminifera rare.

120-125 Calcareous sand, dark-gray; Same as 100-110-foot interval with the addition of coarse subrounded quartz grains. Ostracoda and Foraminifera rare.

125-131 Sand, white; 80 percent coarse to medium-grained subrounded to subangular quartz sand. 15 percent calcareous matrix, hard and well consolidated. 5 percent broken shell fragments. Phosphate nodules and chert pebbles prominent. Ostracoda and Foraminifera rare.

131-140 Dolomitic limestone, light-gray; 10 percent fine to medium-grained subrounded quartz sand. 85 percent calcareous and dolomitic limestone matrix, very hard. 5 percent broken shell fragments. Light-green chlorite(?) grains prominent in matrix. Trace of glauconite and pyrite. Ostracoda and Foraminifera rare, recrystallized.

140-150 Dolomitic, shell limestone, light-gray; 15 percent fine to medium-grained subrounded quartz sand. 50 percent recrystallized and dolomitized shell fragments. 35 percent calcareous and dolomitic-limestone matrix, very hard but porous. Ostracoda and Foraminifera rare, recrystallized.

150-160 Dolomitic, shell limestone, light-gray; Same as 140-150-foot interval with 5 percent increase in quartz sand. Ostracoda and Foraminifera rare.

Ostracoda from 56-160-feet include:
Cytheridea (Haplocytheridea) caldwellensis Howe and Chambers
Brachycythere cf. *B. watervalleyensis* Howe and Chambers
Trachyleberis montgomeryensis (Howe and Chambers)
Trachyleberis sp. *B.*
Loxoconcha jacksonensis Howe and Chambers
Loxoconcha creolensis Howe and Chambers
Cytheretta alexanderi Howe and Chambers

170-180 Dolomitic, shell limestone, light-gray; Same as 150-160-foot interval. No Ostracoda, Foraminifera rare.

180-190 Dolomitic, shell limestone, light-gray; Same as 150-160-foot interval and becoming slightly more sandy. No Ostracoda, Foraminifera rare.

190-200 Dolomitic, shell limestone, light-gray; Same as 180-190-foot interval. No Ostracoda, Foraminifera rare.

Remarks: No fauna occurs by which the age of the material between the 36- and 56-foot interval could be determined. This interval is placed in the Yorktown formation on the basis of the occurrence of the Yorktown formation in nearby wells. The fauna below 130-feet consists mainly of recrystallized Ostracoda and Foraminifera which are not easily identifiable. The intervals between 170-200-feet yielded no Ostracoda. This interval is included within the upper part of the Castle Hayne limestone on the basis of lithology.

Onslow County

Number 5

Location: Town of Richlands, North Carolina.
Owner: Town of Richlands
Date drilled: 1949
Driller: Layne Atlantic Co.
Elevation of well: 50 feet above sea level

Hydrologic Information

Diameter of well: 10 inches
Depth of well: 535 feet
Cased to: 535 feet
Finish: gravel wall and screens
Static (nonpumping) water level: 6 feet below land surface (1949)
Yield: 500 gallons a minute

Log of Well

Depth (feet)

Post-Miocene—surficial clays and sands

0-12 Clay, mottled tan and red; 15 percent very fine-grained quartz sand. 85 percent tan to red clay matrix, unconsolidated and tight. No microfossils.

12-30 Sand and clay, tan; 70 percent medium to fine-grained subangular iron-stained quartz sand. 30 percent tan clay matrix, unconsolidated. Fine-grained ilmenite prominent. No microfossils.

Upper Cretaceous—Peedee formation

30-58 Sand and clay, black; 60 percent very fine-grained angular quartz

sand. 40 percent black clay matrix, unconsolidated but tight. Scattered black-phosphate pebbles. No Ostracoda, Foraminifera very rare.

58-70 Sand and clay, black; Same as 30-58-foot interval. Dark-green fine-grained glauconite prominent. Ostracoda and Foraminifera very rare.

70-90 Sand and clay, black; Same as 58-70-foot interval. Ostracoda and Foraminifera very rare.

90-100 Calcareous sand, gray; 75 percent medium to fine-grained subangular quartz sand. 25 percent calcareous clay matrix, indurated and well consolidated. Coarse broken shell fragments prominent. Ostracoda and Foraminifera rare.

130-173 Sand and clay, black; Same as 58-70-foot interval. Ostracoda and Foraminifera rare.

173-203 Sand and clay, black; Same as 58-70-foot interval. Increase in glauconite to ±5 percent. Ostracoda and Foraminifera very rare.

203-244 Sandy clay, black; 15 percent very fine-grained angular quartz sand. 85 percent black micaceous clay matrix, unconsolidated but very tight. Dark-green fine-grained glauconite prominent. Ostracoda and Foraminifera very rare.

244-248 Glauconitic sand, green; 65 percent fine to medium-grained subangular quartz sand. 25 percent dark-green medium-grained glauconite. 10 percent gray clay matrix, loosely consolidated. Ostracoda and Foraminifera rare.

248-270 Sand and clay, gray; 65 percent medium to fine-grained subangular quartz sand. 35 percent gray clay matrix, unconsolidated. Less than 1 percent dark-green fine-grained glauconite. Ostracoda and Foraminifera rare.

270-290 Sand and shell, gray; 60 percent coarse to medium-grained subrounded to subangular quartz sand. 30 percent shell fragments. 10 percent calcareous clay matrix, hard and well consolidated. Ostracoda and Foraminifera rare.

290-298 Sand and shell, gray; Same as 270-290-foot interval. No Ostracoda, Foraminifera very rare.

298-313 Sand and shell, gray; Same as 270-290-foot interval. No Ostracoda, Foraminifera very rare.

313-325 Sand and shell, gray; Same as 270-290-foot interval. Ostracoda and Foraminifera rare.

325-342 Sandy clay, black; 30 percent fine to very fine-grained angular quartz sand. 70 percent black micaceous clay matrix, unconsolidated. Ostracoda and Foraminifera rare.

342-370 Sandy clay, black; Same as 325-342-foot interval. Ostracoda and Foraminifera rare.

370-381 Sandy clay, black; Same as 325-342-foot interval. Ostracoda and Foraminifera rare.

381-404 Sandy clay, black; Same as 325-342-foot interval. Ostracoda and Foraminifera rare.

404-412 Sand, black; 80 percent medium to fine-grained subrounded to subangular quartz sand. 20 percent black silt and clay matrix, unconsolidated. Ostracoda and Foraminifera very rare.

412-424 Sand and clay, gray; 65 percent fine to medium-grained subangular quartz sand. 30 percent black clay matrix, unconsolidated. 5 percent dark-green fine-grained glauconite. Ostracoda and Foraminifera very rare.

424-443 Sand and clay, gray; Same as 412-424-foot interval. No Ostracoda, Foraminifera very rare.

443-477 Sand and clay, gray; Same as 412-424-foot interval. No Ostracoda, Foraminifera very rare.

477-486 Sand, gray; 85 percent medium to coarse-grained subrounded quartz sand. 15 percent gray clay matrix, unconsolidated. Trace of shell fragments and dark-green fine-grained glauconite. No Ostracoda, Foraminifera very rare.

486-504 Sand, gray; Same as 477-486-foot interval. Ostracoda and Foraminifera very rare.

504-522 Sand, gray; Same as 477-486-foot interval. No Ostracoda, Foraminifera very rare.

Ostracoda occurring in intervals from 30- to 412-feet include:

Bairdoppilata pondera Jennings
Cytheridea (Haplocytheridea) monmouthensis Berry
Cytheridea (Haplocytheridea) punctura (Schmidt)
Brachycythere rhomboidalis (Berry)
Alatacythere alata atlantica (Schmidt)
Trachyleberis communis (Israelsky)
Velarocythere arachoides (Berry)

Remarks: Both Ostracoda and Foraminifera are rare in this set of samples. The entire section below 30-feet is considered to be in the Peedee formation although sample intervals below 412-feet failed to yield a diagnostic fauna. The absence of species confined to the Black Creek formation and the absence of any distinct lithologic break in the section indicates to the writer that the Peedee formation extends to the bottom depth of 522 feet.

Onslow County

Number 6

Location: Oil test, Hofmann Forest number 1, 5 miles south of Belgrade on U. S. Route 17 and 2 miles east of Hofmann Forest Fire Tower.
Owner: Hofmann Forest No. 1
Date drilled: 1953
Driller: Burton Drilling Co.
Elevation of well: 44 feet above sea level

Hydrologic Information

None available. A partial log of this well is included because of its stratigraphic value.

Log of Well

Depth (feet)

Post-Miocene(?) and *Miocene(?)*—undifferentiated

0-102 Sand and clay, light-gray; 75 percent medium to fine-grained angular quartz sand. 25 percent light-gray clay matrix, unconsolidated. Black phosphate shards and pebbles prominent. Trace of white broken-limestone fragments. Ostracoda and Foraminifera rare.

102-162 No sample.

Upper(?) and *Middle Eocene*—Castle Hayne limestone

162-190 Calcareous sand, gray; 85 percent fine to medium-grained angular quartz sand. 15 percent gray calcareous clay matrix, unconsolidated. Black phosphate shards prominent. Trace of dark-green glauconite and broken limestone fragments. Ostracoda and Foraminifera rare.

190-221 Calcareous sand, gray; Same as 162-190-foot interval with black phosphate shards increasing to 5 percent. Ostracoda and Foraminifera common.

221-255 No sample.

255-286 Calcareous sand and clay, gray; 70 percent fine to very fine-grained angular quartz sand. 30 percent gray calcareous clay matrix, loosely consolidated. Trace of dark-green glauconite and black phosphate. Ostracoda common, Foraminifera abundant.

286-316 Calcareous sand and clay, gray; Same as 255-286-foot interval. Ostracoda common, Foraminifera abundant.

316-348 Calcareous sand and clay, gray; Same as 255-286-foot interval with glauconite prominent. Ostracoda common, Foraminifera rare.

Ostracoda from the 162-348-foot intervals include:

Bairdia sp. *A.*
Cytheridea (Clithrocytheridea) virginica (Schmidt)
Brachycythere martini Murray and Hussey
Trachyleberis rukasi (Gooch)
Trachyleberis sp *A.*
Leguminocythereis sp. *A.*
Leguminocythereis scarabaeus Howe and Law
Pterygocythereis washingtonensis Swain
Actinocythereis stenzeli (Stephenson)
Loxoconcha creolensis Howe and Chambers

348-378 No sample.

378-408 Calcareous sand, light-gray; 65 percent medium to fine-grained subangular to angular quartz sand. 15 percent broken abraded shell and limestone fragments. 20 percent gray calcareous clay matrix, loosely consolidated.

408-568 No sample.

568 (sidewall core) Glauconitic sand, gray to green; 60 percent coarse to fine-grained subrounded to angular quartz sand. 25 percent dark-green medium-grained glauconite. 15 percent brown to gray silt and clay matrix, unconsolidated. Trace of fine mica flakes. No microfossils recovered.

568-702 No sample.

702 (sidewall core) Sand, gray; 80 percent medium to fine-grained subangular to angular quartz sand. 15 percent gray clay matrix, unconsolidated. 5 percent white chalky shell fragments. Dark to light-green weathered glauconite prominent. Trace of mica flakes. No microfossils recovered.

702-740 No sample.

740-750 Sand and clay, dark-gray; 70 percent coarse to fine-grained subrounded to angular quartz sand. 25 percent gray clay matrix, unconsolidated. 5 percent dark-green medium-grained glauconite.

Coarse broken shell fragments prominent. Ostracoda and Foraminifera rare.

750-770 No sample.

770-780 Clay and sand, dark-gray; 35 percent medium to very fine-grained angular quartz sand. 65 percent dark-gray clay matrix, unconsolidated but compact. Trace of glauconite and mica flakes. Ostracoda and Foraminifera rare.

780-810 Glauconitic sand, "salt and pepper"; 35 percent medium to fine-grained subangular to angular quartz sand. 55 percent dark-green medium-grained glauconite. 10 percent gray clay matrix, unconsolidated. Coarse broken abraded shell fragments prominent. Trace of fine-grained pyrite aggregates and indurated sandy aggregates. Ostracoda and Foraminifera rare.

810-840 Sand, gray; 70 percent coarse to fine-grained subrounded to angular quartz sand. 15 percent gray clay matrix, indurated and well consolidated in layers. 10 percent coarse broken abraded shell fragments. 5 percent dark-green glauconite. No Ostracoda, Foraminifera rare.

840-870 No sample.

870-900 Sand, gray; Same as 810-840-foot interval. Ostracoda and Foraminifera rare.

900-930 Sand, gray; Same as 810-840-foot interval with black lignitized wood fragments prominent. Ostracoda and Foraminifera rare.

930-960 Sand, gray; Same as 900-930-foot interval.

960-1033 No sample.

1033 (sidewall core) Glauconitic sand, green; 60 percent medium to fine-grained angular quartz sand. 35 percent light to dark-green fine-grained glauconite. 5 percent green clay matrix, unconsolidated. Ostracoda very rare, no Foraminifera.

Ostracoda from the 348-1033-foot intervals include:
Cytherelloidea swaini Brown
Cytherelloidea sohni Brown
Bairdoppilata pondera Jennings
Cytheridea (Haplocytheridea) monmouthensis Berry
Trachyleberis communis (Israelsky)
Platycythereis costatana angula (Schmidt)
Velarocythere legrandi Brown
Velarocythere cacumenata Brown
Velarocythere arachoides (Berry)
Loxoconcha neuseensis Brown

1033-1093 No sample.

Upper Cretaceous—Black Creek formation

1093-1120 Sand and clay, dark-gray; 70 percent coarse to medium-grained subrounded to subangular quartz sand. 25 percent gray to black micaceous clay matrix, unconsolidated. 5 percent dark-green glauconite. Broken shell fragments prominent. Ostracoda and Foraminifera common.

Ostracoda from the 1093-1120-foot interval are:
Cytherella tuberculifera Alexander
Cytheridea (Haplocytheridea) monmouthensis Berry
Brachycythere nausiformis Swain
Brachycythere sphenoides (Reuss)
Trachyleberis gapensis (Alexander)
Protocythere paratriplicata Swain

Remarks: There is no distinct lithologic break between the Peedee and Black Creek formations in this well as is the case in most wells from which we have samples. The top of the Black Creek formation is picked on the highest occurrence of *Brachycythere nausiformis* Swain which is not known to occur in strata of post-Taylor age in the North Carolina Coastal Plain.

Basement rock was reported in this well at 1500+ feet. The writer has found no evidence of pre-Austin sediments in this well and believes that the Tuscaloosa Formation is absent.

Onslow County

Number 7

Location: 1.5 miles south of Belgrade on an unnumbered county road between Belgrade and Silverdale, North Carolina.
Owner: Mr. Harrington
Date drilled: 1952
Driller: Blake Well Co.
Elevation of well: 37 feet above sea level

Hydrologic Information

No hydrologic information is available for this well.

Log of Well

Depth (feet)

0-10 No sample.

Post-Miocene—surficial sands

10-20 Sand, tan; 60 percent coarse to medium-grained rounded to subrounded quartz sand. 15 percent fine rounded gravel. 25 percent tan silt and clay matrix, unconsolidated. No microfossils.

20-30 Sand, tan; Same as 10-20-foot interval. No microfossils.

Upper(?) Eocene—upper part of Castle Hayne limestone

30-40 Marl, light-gray; 40 percent fine-grained subangular quartz sand. 30 percent broken abraded shell fragments. 30 percent gray calcareous matrix, loosely consolidated. Ostracoda and Foraminifera rare.

40-50 Marl, light-gray; Same as 30-40-foot interval. Ostracoda and Foraminifera common.

50-55 Marl, light-gray; Same as 30-40-foot interval with slight increase in quartz sand and a corresponding decrease in shell fragments. Ostracoda and Foraminifera common.

Ostracoda from 30-55-feet include:
Cytheridea (Clithrocytheridea) caldwellensis Howe and Chambers
Brachycythere watervalleyensis Howe and Chambers
Trachyleberis montgomeryensis (Howe and Chambers)
Monoceratina alexanderi Howe and Chambers

Pender County

Number 1

Location: New Topsail Inlet
Owner: U. S. Army
Date drilled: 1942
Driller: Heater Well Co.
Elevation of well: 7 feet above sea level

Hydrologic Information

Diameter of well: 6 inches
Depth of well: 235 feet
Cased to: 168 feet
Finish: open end
Static (nonpumping) water level: Unknown
Yield: Unknown

Log of Well

Depth (feet)

Post-Miocene—surficial beach deposits

1-7 Sand and shell, white; 50 percent fine-grained subangular quartz sand. 35 percent tan rounded shell fragments. 15 percent tan clay matrix, unconsolidated. No microfossils.

7-15 Sand and shell, tan; 35 percent fine to medium-grained subangular quartz sand. 55 percent tan rounded shell fragments. 10 percent tan clay matrix, unconsolidated. No microfossils.

15-30 Sand and shell, tan; Same as 7-15-foot interval. No microfossils.

30-47 Sand and shell, tan; Same as 7-15-foot interval with 20 percent decrease in shell content and increase in sand content. No Ostracoda, Foraminifera very rare.

Upper(?) Eocene—upper part of Castle Hayne limestone

47-70 Calcareous sand, cream; 45 percent fine to medium-grained subrounded quartz sand. 40 percent coarse broken shell and limestone fragments. 15 percent calcareous clay matrix, unconsolidated. Trace of dark-green glauconite. Ostracoda and Foraminifera common.

70-73 Calcareous sand, cream; 65 percent fine-grained subangular quartz sand. 15 percent fine broken shell and limestone fragments. 20 percent calcareous clay matrix, indurated. Ostracoda and Foraminifera common.

73-76 Sandy dolomite, gray; 15 percent fine to medium-grained subangular quartz sand. 85 percent dolomitic partially recrystallized shell fragments and dolomite matrix, very hard and well consolidated but porous. Ostracoda and Foraminifera very rare, recrystallized.

76-80 Sandy dolomite, gray; Same as 73-76-foot interval. Ostracoda and Foraminifera very rare, recrystallized.

80-90 Sandy limestone, white; 25 percent fine to medium-grained sub-

angular quartz sand. 50 percent broken shell and limestone fragments. 20 percent calcareous clay matrix, well consolidated but very porous. 5 percent black fine-grained phosphate. Ostracoda and Foraminifera common, recrystallized.

90-100 Sandy limestone, white; Same as 80-90-foot interval. Ostracoda and Foraminifera common, recrystallized.

104-112 Sandy limestone, white; 35 percent fine-grained angular water-polished quartz sand. 45 percent broken shell and limestone fragments. 15 percent calcareous clay matrix, indurated and moderately consolidated. 5 percent black fine-grained phosphate. Trace of dark-green fine-grained glauconite. Ostracoda and Foraminifera common, recrystallized.

Ostracoda from the 47-104-foot intervals include:
Cytherelloidea sp. *A.*
Cytheridea (Clithroeytheridea) caldwellensis Howe and Chambers
Brachyeythere watervalleyensis Howe and Chambers
Trachyleberis sps. *A.* and *B.*
Trachyleberis montgomeryensis (Howe and Chambers)
Leguminoeythereis searabaeus Howe and Law

Lower Eocene—unnamed unit

116-125 Glauconitic sand, "salt and pepper"; 70 percent fine-grained angular quartz sand. 20 percent dark-green fine-grained glauconite. 5 percent green calcareous clay matrix, unconsolidated. Ostracoda and Foraminifera common.

125-128 Calcareous sand, light-gray; 50 percent medium to fine-grained subrounded to angular quartz sand. 25 percent broken abraded shell and limestone fragments. 20 percent calcareous clay matrix, hard and well consolidated. 5 percent dark-green medium-grained glauconite. Trace of black phosphate grains. Ostracoda and Foraminifera common.

128-142 Calcareous sand, light-gray; Same as 125-128-foot interval. Ostracoda and Foraminifera common.

142-154 Sandy limestone, cream; 25 percent fine to medium-grained subangular quartz sand. 30 percent partially-recrystallized shell and limestone fragments. 40 percent calcareous matrix, hard and well consolidated but very porous. 5 percent dark-green medium-grained glauconite. Ostracoda and Foraminifera rare.

154-162 Sandy limestone, cream: Same as 142-154-foot interval with a slight increase in percentage of quartz sand. Ostracoda and Foraminifera rare, recrystallized.

162-182 Sandy limestone, cream; Same as 154-162-foot interval. Ostracoda and Foraminifera rare, recrystallized.

182-192 Calcareous sand, gray; 55 percent fine-grained angular to subangular quartz sand. 15 percent broken shell and limestone fragments. 20 percent gray calcareous clay matrix, unconsolidated. 10 percent dark-green fine-grained glauconite. Trace of black phosphate grains. Ostracoda and Foraminifera common.

192-220 Calcareous sand, gray; Same as 182-192-foot interval but indurated. Ostracoda and Foraminifera rare, recrystallized.

220-235 Calcareous sand, gray; Same as 192-220-foot interval. Ostracoda and Foraminifera rare.

Ostracoda from the 116-220-foot interval include:
Cytheridea (Clithrocytheridea) virginica (Schmidt)
Brachycythere marylandica (Ulrich)
Trachyleberis bassleri (Ulrich)
Trachyleberis communis aquia (Schmidt)
Eucythere triordinis Schmidt

Pender County

Number 2

Location: Test well at the Mueller Bulb farm, Roeky Point, North Carolina.
Owner: Mueller Farms
Date drilled: 1953
Driller: Heater Well Co.
Elevation of well: 35 feet above sea level

Hydrologic Information

None available. Well abandoned because of excessive chloride below 360 feet.

Log of Well

Depth (feet)

Post-Miocene—surficial clays and sands

0-10 Clay and sand, light-tan; 30 percent medium to fine-grained angular quartz sand. 70 percent tan clay matrix, unconsolidated but compact. Fine mica flakes prominent. Limonitic staining of quartz grains prominent. No microfossils.

Upper Cretaceous—Peedee formation

10-20 Sand, brown; 80 percent coarse to fine-grained subangular to angular quartz sand. 20 percent brown ferruginous clay matrix, moderately consolidated. Trace of light-green glaueonite. Limonitic staining of quartz grains predominant. No microfossils.

20-30 Sand, dark-gray; 85 percent fine-grained angular quartz sand. 15 percent dark-gray micaceous clay and silt matrix, unconsolidated. Light-green fine-grained glauconite prominent. No Ostracoda, Foraminifera very rare.

30-40 Sand, dark-gray; Same as 20-30-foot interval. No Ostracoda, Foraminifera very rare.

40-50 Sand, light-gray; 75 percent very fine-grained angular quartz sand. 20 percent gray micaceous clay matrix, unconsolidated. 5 percent light-green glauconite. No Ostracoda, Foraminifera very rare.

50-60 Sand, light-gray; Same as 40-50-foot interval. No microfossils.

60-70 Sand and shell, gray; 30 percent coarse to medium-grained subrounded to subangular quartz sand. 55 percent coarse broken abraded shell fragments. 15 percent gray calcareous clay matrix, indurated and well consolidated. Ostracoda and Foraminifera very rare.

70-80 Sand and clay, dark-gray; 55 percent coarse to fine-grained subangular poorly-sorted quartz sand. 30 percent dark-gray micaceous clay matrix, unconsolidated but compact. 15 percent coarse broken abraded shell fragments. Trace of dark-green glauconite. No Ostracoda, Foraminifera very rare.

80-90 Sand and clay, dark-gray; Same as 70-80-foot interval, but indurated and moderately consolidated.

90-100 Sand and clay, dark-gray; Same as 80-90-foot interval. No Ostracoda, Foraminifera very rare.

100-110 Sand and clay, dark-gray; Same as 80-90-foot interval. No Ostracoda, Foraminifera very rare.

110-120 Sand and clay, black; 70 percent very fine-grained angular quartz sand. 30 percent black micaceous clay and silt matrix, unconsolidated but eompact. Trace of dark-green glauconite and broken shell fragments. No Ostracoda, Foraminifera very rare.

120-150 Sand and clay, black; Same as 110-120-foot interval. Ostracoda and Foraminifera very rare.

150-180 Sand and clay, black; Same as 110-120-foot interval. No Ostracoda, Foraminifera very rare.

180-210 Sand and clay, black; Same as 110-120-foot interval with slight increase in clay matrix. No Ostracoda, Foraminifera very rare.

210-230 Sand and clay, black; Same as 110-120-foot interval.

230-240 Sand and clay, black; Same as 110-120-foot interval. Ostracoda very rare, Foraminifera rare.

240-250 Sand and clay, black; Same as 110-120-foot interval. No microfossils.

250-260 Sand and clay, black; 60 percent fine to very fine-grained angular quartz sand. 30 percent black clay matrix, unconsolidated but compact. 10 percent broken ehalky shell fragments. Dark-green fine-grained glauconite prominent. Trace of marcasite aggregates. No Ostracoda, Foraminifera very rare.

260-270 Sand, light-gray; 90 percent coarse to medium-grained subrounded to subangular quartz sand. 10 percent gray clay matrix, unconsolidated. Coarse broken abraded shell fragments prominent. Trace of dark-green coarse to medium-grained glauconite and marcasite aggregates. No Ostracoda, Foraminifera rare.

270-280 Sand and clay, black; 60 pereent fine to very fine-grained angular quartz sand. 25 percent black micaceous clay matrix, unconsolidated but compact. 15 percent coarse broken abraded shell fragments. Trace of marcasite aggregates. Ostracoda and Foraminifera very rare.

280-310 Sand and clay, black; Same as 270-280-foot interval. No Ostracoda, Foraminifera very rare.

310-320 Sand, dark-gray; 65 percent coarse to fine-grained subrounded to angular poorly-sorted quartz sand. 20 percent dark-gray micaceous clay matrix, unconsolidated. 15 pereent coarse broken shell fragments. Trace of dark-green glauconite and marcasite aggregates. No Ostracoda, Foraminifera very rare.

320-330 Sand, dark-gray; Same as 310-320-foot interval. Ostracoda and Foraminifera very rare.

Upper Cretaceous—Peedee formation(?)

330-350 Sand, gray; 85 percent coarse to medium-grained subrounded quartz sand. 10 percent gray ealcareous matrix, indurated and moderately consolidated. 5 percent coarse shell fragments. No Ostracoda, Foraminifera very rare.

350-357 Sand, gray; 85 percent medium to fine-grained angular quartz

sand, 15 percent gray clay matrix. Dark-green fine-grained glauconite prominent. Trace of marcasite aggregates and acicular gypsum. No microfossils.

357-464 No sample.

464-480 Sand, gray; 80 percent very coarse to medium-grained subrounded to subangular quartz sand. 15 percent gray clay matrix, unconsolidated. 5 percent broken shell fragments. Light-green medium-grained glauconite and black phosphate pebbles prominent. Trace of marcasite aggregates and black lignitized wood fragments. Ostracoda and Foraminifera very rare.

480-490 Sand, gray; Same as 464-480-foot interval. No microfossils.

490-570 No sample.

570-580 Sand, gray; 80 percent medium to fine-grained angular quartz sand. 10 percent gray clay matrix. 10 percent light-green fine-grained glauconite. Trace of black lignitized wood fragments marcasite aggregates and broken shell fragments. Ostracoda and Foraminifera very rare.

Remarks: Ostracoda in these samples were very rare. Ostracoda recovered from the following intervals are as follows:

60-70 *Cytheridea (Haplocytheridea) ulrichi* (Berry)
Trachyleberis pidgeoni (Berry)

120-150 *Cytheridea (Haploeytheridea)* monmouthensis Berry
Trachyleberis pidgeoni (Berry)
Platycythereis costatana angula (Schmidt)

230-240 *Cytheridea (Haplocytheridea) ulrichi* (Berry)

270-280 *Cytheridea (Haplocytheridea) monmouthensis* Berry
Brachycythere raleighensis Brown
Orthonotacythere hannai (Israelsky)

320-330 *Brachycythere raleighensis* Brown

570-580 *Cytheridea (Haplocytheridea) ulrichi* (Berry)

Only one ostracode was recovered below 330-feet. The strata below 330-feet are provisionally placed in the Peedee formation on the basis of lithology but may represent the Black Creek formation. Foraminifera below 330 feet are rare but are predominantly *Robulus* sp. that occur in both the Peedee and Black Creek formations.

Perquimans County

Number 1

Location: Well number 1 at Harvey Point Seaplane Base.
Owner: U. S. Navy
Date drilled: 1942 (abandoned)
Driller: Sydnor Pump and Well Co.
Elevation of well: 8 feet above sea level

Hydrologic Information

Diameter of well: 8 inches
Depth of well: 77 feet
Cased to: 77 feet
Finish: screens from 55-75-feet
Static (nonpumping) water level: 8 feet below land surface (1942)
Yield: 12 gallons a minute with a 46-foot drawdown (1942)
Chemical analysis of water available

Remarks: Several nearby wells, drilled to depths between 81 and 87 feet with screen settings between 50 and 80 feet, had variable yields from a minimum of 30 gallons a minute to a maximum of 165 gallons a minute.

Log of Well

Depth (feet)

0-26 No sample.

Post-Miocene—surficial sands

26-38 Sand, tan; 80 percent medium to fine-grained subangular to angular quartz sand. 20 percent tan clay matrix unconsolidated. Very fine-grained ilmenite prominent. No microfossils.

38-43 Sand, tan; Same as 26-38-foot interval. No microfossils.

Upper Miocene—Yorktown formation

43-46 Sand, gray; 70 percent coarse to medium-grained subrounded to subangular quartz sand. 20 percent gray clay matrix, unconsolidated. 10 percent coarse broken abraded shell fragments. Ostracoda and Foraminifera rare.

46-55 Clay and sand, gray; 40 percent fine-grained angular water-polished quartz sand. 50 percent blue-gray clay matrix, unconsolidated but tight. 10 percent fine broken shell fragments. Ostracoda rare, Foraminifera common.

55-57 Sand, gray; 75 percent fine to very fine-grained angular quartz sand. 15 percent blue-gray clay and silt matrix. 10 percent poorly-sorted shell fragments.

57-65 Sand and clay, gray; 65 percent fine to coarse-grained angular to subrounded poorly-sorted quartz sand. 35 percent blue-gray clay and silt matrix, unconsolidated. Ostracoda and Foraminifera rare.

65-74 Sand and clay, gray; Same as 57-65-foot interval. Ostracoda and Foraminifera rare.

Ostracoda occurring between 46-65-foot intervals include:
Leguminocythereis whitei Swain
Actinocythereis exanthemata (Ulrich and Bassler)
Echinocythereis evax (Ulrich and Bassler)
Cushmanidea ashermani (Ulrich and Bassler)

Remarks: The writer considers the material from 43 to 74 feet to be of late Miocene age. *Echinocythereis evax* (Ulrich and Bassler) probably extends into the late Miocene in North Carolina or it may, less probably, be a reworked specimen from the middle Miocene.

Pitt County

Number 1

Location: Well number 2 in town of Ayden.
Owner: Town of Ayden
Date drilled: 1950
Driller: Carolina Drilling Co.
Elevation of well: 63 feet above sea level

Hydrologic Information

Diameter of well: 8 inches
Depth of well: 436 feet
Cased to: 395 feet
Finish: screens
Static (nonpumping) water level: 18 feet below land surface (1950)
Yield: 250 gallons a minute with a 52-foot drawdown.
Chemical analysis of water available.

Log of Well

Depth (feet)

Post-Miocene—surficial sands and clays

1-12 Clay, yellow; 20 percent fine to very fine-grained angular quartz sand. 80 percent yellow clay matrix, unconsolidated but compact.

12-23 Sand, yellow; 90 percent coarse to fine-grained subrounded to angular poorly-sorted quartz sand. 10 percent yellow clay matrix, unconsolidated. Trace of fine-grained ilmenite and mica flakes. Limonitic staining of quartz grains prominent. No microfossils.

Upper Cretaceous—Peedee formation

32-52 Sand, light-gray; 85 percent fine-grained angular well-sorted quartz sand. 15 percent light-gray clay matrix, unconsolidated. Trace of fine-grained glauconite and shell fragments. No Ostracoda, Foraminifera very rare.

52-70 Glauconitic sand, "salt and pepper"; 55 percent medium to fine-grained subangular quartz sand. 30 percent dark-green fine-grained glauconite. 15 percent gray clay matrix, unconsolidated. Trace of broken shell fragments and black phosphate pebbles. Ostracoda and Foraminifera very rare.

70-90 Glauconitic sand, "salt and pepper"; Same as 52-70-foot interval with slight decrease in percentage of glauconite. Ostracoda and Foraminifera very rare.

90-110 Sand and clay, gray; 70 percent medium to fine-grained subrounded to angular quartz sand. 25 percent gray clay matrix, unconsolidated. 5 percent dark-green medium-grained glauconite. Trace of broken shell fragments and black phosphate pebbles. Ostracoda and Foraminifera very rare.

110-130 Sand and clay, gray; Same as 90-110-foot interval. No Ostracoda, Foraminifera very rare.

130-150 Sand, gray; 85 percent fine-grained angular well-sorted quartz sand. 15 percent gray clay matrix, unconsolidated. Dark-green fine-grained glauconite prominent. Trace of broken shell fragments. No Ostracoda, Foraminifera rare.

Ostracoda occurring in the 52-130-foot intervals include:
Bairdoppilata pondera Jennings
Cytheridea (Haplocytheridea) ulrichi (Berry)
Cytheridea (Haplocytheridea) fabaformis (Berry)
Alatacythere alata atlantica (Schmidt)
Trachyleberis communis (Israelsky)

Upper Cretaceous—Black Creek formation

150-190 Sand, gray; 90 percent coarse to medium-grained subrounded quartz sand. 10 percent gray micaceous clay matrix, unconsolidated. Trace of glauconite marcasite and broken chalky shell fragments. *Inoceramus* prisms. Ostracoda and Foraminifera very rare.

190-212 Sand, gray; Same as 150-190-foot interval. Ostracoda and Foraminifera very rare.

Ostracoda from the 150-190-foot intervals include:
Cytheridea (Haplocytheridea) monmouthensis Berry
Brachycythere sphenoides (Reuss)
Brachycythere sp. aff. *B. nausiformis* Swain

Remarks: No Ostracoda were recovered from the 32-52-foot interval. The interval is included within the Peedee formation on the basis of Foraminifera.

Pitt County

Number 2

Location: Langston farm on N. C. Route 11, 2 miles north of Winterville, North Carolina.
Owner: Don Langston
Date drilled: 1954
Driller: Martin Well Co.
Elevation of well: 63.2 feet above sea level

Hydrologic Information

Diameter of well: 12 inches
Depth of well: +378 feet
Cased to: 378 feet
Finish: gravel wall and screens
Static (nonpumping) water level: 12 feet below land surface (1954)
Yield: Tested at 250 gallons a minute with a drawdown of 15 feet.

Log of Well

Depth (feet)

0-5 No sample.

Post-Miocene—surficial sands and clays

5-9 Sand and silt, brown; 75 percent fine to very fine-grained angular quartz sand. 25 percent brown silt matrix, unconsolidated. Trace of fine-grained ilmenite. No microfossils.

9-24 Sand, white; 90 percent fine-grained angular well-sorted quartz sand. 10 percent tan clay matrix, unconsolidated. Trace of ilmenite and coarse mica flakes. No microfossils.

Upper Cretaceous—Peedee formation

24-34 Sand and clay, dark-gray; 75 percent coarse to medium-grained subrounded quartz sand. 25 percent gray clay matrix, unconsolidated. Dark-green medium-grained glauconite prominent. Trace of coarse broken shell fragments and phosphate pebbles. Ostracoda and Foraminifera rare.

34-66 Clay and sand, dark-gray; 35 percent fine to medium-grained angular to subangular quartz sand. 65 percent gray micaceous clay matrix, unconsolidated but compact. Trace of glauconite and phosphate. Ostracoda and Foraminifera rare.

66-76 Sand, gray; 75 percent fine to very fine-grained angular quartz sand. 15 percent gray clay matrix, unconsolidated. 10 percent dark-green fine-grained glauconite. No Ostracoda, Foraminifera very rare.

90-105 Sand and clay, dark-gray; 60 percent fine to very fine-grained angular quartz sand. 40 percent gray micaceous clay matrix, unconsolidated but very compact. Dark-green very fine-grained glauconite prominent. Trace of broken shell fragments and scattered phosphate pebbles. Ostracoda and Foraminifera rare.

105-110 Sand and clay, dark-gray; Same as 90-105-foot interval. Ostracoda and Foraminifera common.

Ostracoda from the 24-119-foot intervals include:
Cytheridea (Haplocytheridea) fabaformis (Berry)
Cytherura glossensis Brown
Brachycythere rhomboidalis (Berry)
Trachyleberis communis (Israelsky)
Velarocythere arachoides (Berry)

Upper Cretaceous—Black Creek formation

119-132 Clay and sand, black; 45 percent very fine to fine-grained angular quartz sand. 55 percent black micaceous clay matrix, unconsolidated but very compact. Trace of light-green glauconite and broken chalky shell fragments. *Inoceramus* prisms. Ostracoda and Foraminifera rare.

132-155 Sand and clay, black; 75 percent coarse to fine-grained rounded to angular poorly-sorted quartz sand. 25 percent black micaceous clay matrix, unconsolidated. Broken chalky shell fragments prominent. Trace of marcasite aggregates and dark-green glauconite. Ostracoda and Foraminifera very rare.

155-185 Sand and clay, black; Same as 132-155-foot interval. Ostracoda and Foraminifera very rare.

Ostracoda from the 119-185-foot interval include:
Cytheridea (Haplocytheridea) monmouthensis Berry
Brachycythere ledaforma (Israelsky)
Brachycythere sphenoides (Reuss)
Orthonotacythere tarensis Brown
Protocythere paratriplicata Swain

185-205 No sample.

Upper Cretaceous—Tuscaloosa formation

205-219 Clay and sand, gray; 30 percent fine to very fine-grained angular quartz sand. 65 percent gray micaceous clay matrix, unconsolidated but very tight. 5 percent black lignitized wood fragments. Trace of dark-green coarse-grained glauconite and marcasite aggregates.

219-225 Clay and sand, gray; Same as 205-219-foot interval.

225-241 Clay, mottled-gray and pink; 10 percent very fine-grained angular quartz sand. 90 percent mottled clay matrix, unconsolidated but very compact. Mica flakes prominent. No microfossils.

241-254 Clay, mottled-gray and pink; Same as 225-241-foot interval. No microfossils.

254-285 Sand, light-gray; 85 percent fine to very fine-grained angular quartz sand. 15 percent gray clay matrix, unconsolidated. Trace of mica flakes and fine-grained ilmenite.

285-309 Clay and sand, gray; 30 percent fine-grained angular quartz sand. 70 percent gray clay matrix, unconsolidated but compact. Trace of mica flakes.

309-322 Silt and sand, brick-red; 40 percent fine to very fine-grained angular water-polished quartz sand. 60 percent brick-red micaceous silt and clay matrix, unconsolidated but compact.

322-338 Sand and clay, yellow; 60 percent fine-grained angular quartz sand. 40 percent yellow clay and silt matrix, unconsolidated but tight.

338-350 Clay, gray; 10 percent fine to very fine-grained angular quartz sand. 90 percent gray micaceous clay matrix, unconsolidated but very tight and compact.

350-353 Sand, white; 85 percent very coarse to medium-grained rounded to subrounded quartz sand. 15 percent gray clay matrix, unconsolidated. Coarse mica flakes prominent.

353-368 Clay, mottled-gray and yellow; 10 percent medium to fine-grained angular quartz sand. 90 percent gray to yellow micaceous clay matrix, unconsolidated but very compact.

368-378 Sand, white; 85 percent medium-grained angular well-sorted quartz sand. 15 percent gray to yellow micaceous clay matrix, unconsolidated.

Remarks: The sample is missing at the Black Creek-Tuscaloosa contact. The top(?) of the Tuscaloosa is placed at 205-feet in conformity with its upper limits in nearby wells. No microfossils were recovered from the Tuscaloosa formation(?). Correlation is based on lithology and stratigraphic position. Several thin beds of indurated sand and shell occur in the Peedee formation. The large intervals represented by individual samples makes it impossible to determine the thickness of such strata.

Pitt County

Number 3

Location: Johnson farm, 1 mile southwest of Bellarthur, North Carolina.
Owner: L. B. Johnson
Date drilled: 1954
Driller: Heater Well Co.
Elevation of well: 63 feet above sea level

Hydrologic Information

Diameter of well: 8 inches
Depth of well: 370 feet
Cased to: 370 feet
Finish: gravel wall and screens
Static (nonpumping) water level: 33 feet below land surface (January 7, 1955)

Yield. Tested at 575 gallons a minute with a 94-foot drawdown (January 7, 1955)
Temperature of water: 62.7°F

Log of Well

Depth (feet)	
	Post-Miocene—surficial sands and clays
0-10	Clay, tan: 10 percent very fine-grained angular quartz sand. 90 percent mottled-tan clay matrix, unconsolidated. Mica flakes prominent. No microfossils.
10-22	Clay, tan; Same as 0-10-foot interval. No microfossils.
22-30	Sand, tan; 80 percent coarse to medium-grained subangular quartz sand. 20 percent tan clay matrix, unconsolidated. Trace of mica flakes and ilmenite. No microfossils.
	Upper Cretaccous—Peedee formation
30-40	Sand and clay, gray; 70 percent coarse to medium-grained subrounded quartz sand. 30 percent gray to black clay matrix, unconsolidated. Trace of glauconite pyrite and mica.
40-51	Sand, gray; 80 percent fine to coarse-grained angular to rounded poorly-sorted quartz sand. 20 percent gray clay matrix. Fine-grained glauconite prominent. Trace of mica and pyrite.
51-61	Sand, gray; 80 percent medium-grained subangular quartz sand. 20 percent gray to black clay matrix, unconsolidated. Carbonaceous material showing partial replacement by pyrite prominent.
61-75	Sand, gray; Same as 51-61-foot interval.
75-81	Sand, gray; Same as 51-61-foot interval.
	Upper Cretaceous—Black Creek formation
81-90	Sand and clay, black; 60 percent fine to medium-grained subangular quartz sand. 40 percent gray to black clay matrix, unconsolidated. Pyrite aggregates and partial pyrite replacement of carbonaceous material prominent.
90-101	Clay and sand, black; 30 percent fine-grained angular quartz sand. 70 percent black silt and clay matrix, unconsolidated. Pyrite aggregates and carbonaceous material prominent.
101-117	Clay and sand, black; Same as 90-101-foot interval.
117-121	Sand and clay, gray; 60 percent fine to medium-grained subangular quartz sand. 40 percent gray clay matrix, unconsolidated. Trace of fine-grained glauconite pyrite and carbonaceous material.
121-134	Clay, gray; 10 percent very fine-grained angular quartz sand. 90 percent gray micaceous clay matrix, unconsolidated. No Ostracoda, Foraminifera very rare.
	Upper Cretaccous—Tuscaloosa formation(?)
134-141	Clay, red; 20 percent fine-grained angular quartz sand. 80 percent red clay matrix, unconsolidated. Trace of mica flakes.
141-160	Sand, gray; 90 percent coarse-grained subrounded quartz sand. 10 percent gray silt and clay matrix, unconsolidated. Trace of fine-grained glauconite. Potash feldspar grains prominent.
160-176	Sand, gray; Same as 141-160-foot interval.
176-190	Clay, gray; 20 percent medium to fine-grained angular water-polished quartz sand. 80 percent gray micaceous clay matrix, unconsolidated but very compact.
190-204	Clay and sand, mottled-brown and gray; 30 percent medium to fine-grained subangular quartz sand. 70 percent clay matrix, unconsolidated. Limonitic staining of quartz grains and aggregates prominent.
204-211	Clay and sand, mottled-brown and gray; Same as 190-204-foot interval.
211-221	Sand, gray; 90 percent coarse-grained subrounded quartz sand. 10 percent gray clay matrix, unconsolidated. Coarse blocky potash feldspar grains prominent.
221-246	Clay, gray; 20 percent fine-grained angular quartz sand. 80 percent gray micaceous clay matrix, unconsolidated.
246-253	Clay, gray; Same as 221-246-foot interval.
253-261	Sand, gray; 90 percent coarse-grained subrounded well-sorted quartz sand. 10 percent gray clay matrix, unconsolidated. Trace of coarse blocky potash-feldspar grains.
261-281	Sand, gray; Same as 253-261-foot interval.
281-290	Sand, gray; Same as 253-261-foot interval with slight increase in clay matrix.
290-301	Clay, gray; 20 percent fine to medium-grained angular quartz sand. 80 percent gray micaceous clay matrix, unconsolidated but compact.
301-318	Sand, gray; 80 percent coarse to medium-grained subrounded quartz sand. 20 percent gray micaceous clay matrix, unconsolidated.
318-328	Clay, no recovery.
328-341	Sand, gray; 70 percent coarse-grained subrounded quartz sand. 30 percent gray clay matrix, unconsolidated. Potash feldspar grains and limonitic staining of quartz grains prominent.
341-369	Sand, gray; Same as 328-341-foot interval.
369-381	Sand, gray; Same as 328-341-foot interval.

Remarks: The entire section, with the exception of the 121-134-foot interval was unfossiliferous. The 121-134-foot interval contains a dwarf foraminiferal assemblage characteristic of the Snow Hill marl member of the Black Creek formation in outcrop at Little Blue Banks Landing on the Tar River. No further attempt was made to identify this faunule. The contact between the Peedee and Black Creek formations is based upon stratigraphic position and upon lithologic and faunal relationships in nearby wells and outcropping sections.

Robeson County

Number 1

Location: Town of Lumberton, Well number 2 at power station of Carolina Power and Light Co.
Owner: Carolina Power and Light Co.
Date drilled: 1949
Driller: Layne Atlantic Co.
Elevation of well: 165 feet above sea level

Hydrologic Information

Diameter of well: 12 inches to 6 inches
Depth of well: 310 feet
Cased to: 220 feet
Finish: screens
Static (nonpumping) water level: 17 feet below land surface (1949)
Yield: Tested at 126 gallons a minute with a 21-foot drawdown

Log of Well

Depth (feet)	
	Post-Miocene—surficial sands and clays
0-25	Sand and clay, tan; 70 percent fine to very fine-grained angular quartz sand. 30 percent tan clay matrix, unconsolidated. Limonitic staining of quartz grains predominant.
	Upper Miocene—Yorktown formation
25-35	Marl, tan to gray; 10 percent coarse-grained subrounded quartz sand. 65 percent coarse broken shell fragments. 25 percent tan to gray clay matrix, unconsolidated. Ostracoda and Foraminifera rare.

Ostracoda from 25-35-feet include:
Puriana rugipunctata (Ulrich and Bassler)
Hemicythere conradi Howe and McGuirt
Hemicythere confragosa Edwards
Loxoconcha reticularis Edwards

	Upper Cretaceous—Black Creek formation
35-60	Sand and clay, light-tan; 60 percent coarse to medium-grained subrounded quartz sand. 5 percent coarse-grained potash feldspar. 35 percent light-tan micaceous clay matrix, unconsolidated.
60-75	Sand and clay, light-tan; Same as 35-60-foot interval with 25 percent of quartz sand in the very coarse-grain size.
75-115	Clay, black; 10 percent very fine-grained angular quartz sand. 85 percent black micaceous clay matrix, unconsolidated but very tight. 5 percent black lignitized wood fragments.
115-138	Sand, tan; 75 percent coarse-grained subrounded quartz sand. 5 percent coarse-grained blocky potash-feldspar. 20 percent tan clay matrix, unconsolidated. Mica flakes prominent.
138-146	Clay, black; Same as 75-115-foot interval with a trace of dark-green very fine-grained glauconite.
146-181	Sand, tan; Same as 115-138-foot interval. Foraminifera rare.
181-204	Clay, black; Same as 138-146-foot interval. Several dwarf Foraminifera, *Anomalina* ? sp. and *Globigerina* sp. occur in the 181-204-foot interval.
204-228	Sand and clay, tan; 75 percent medium to fine-grained subrounded to angular quartz sand. 25 percent tan micaceous clay matrix, unconsolidated.
	Upper Cretaceous—Tuscaloosa formation
	Clay and sand, pink to tan; 35 percent very fine-grained angular quartz sand. 65 percent pink to tan micaceous clay matrix, unconsolidated but tight.

277-298 Sand and clay, tan; 60 percent coarse to medium-grained subrounded to subangular quartz sand. 10 percent very coarse to medium-grained angular potash feldspar. 30 percent tan micaceous clay matrix, unconsolidated.

298-310 Sand and clay, mottled-tan to gray; 60 percent very fine-grained angular quartz sand. 40 percent tan to gray micaceous clay matrix, unconsolidated but very tight.

Remarks: a bottom sample (435 feet) from a nearby well in Lumberton consisted of a soft gray weathered slate with large euhedral crystals of pyrite. The exact depth to basement in the area is unknown, but is presumed to be slightly less than 435 feet.

Robeson County

Number 2

Location: S. J. Smith Farm, 2 miles west of Fairmont, North Carolina, on N. C. Route 130.
Owner: Sam J. Smith
Date drilled: 1954
Driller: Heater Well Co.
Elevation of well: 138 feet above sea level

Hydrologic Information

Depth of well: 162 feet

Log of Well

Depth (feet)

0-15 No sample.

Post-Miocene—surficial sands and clays

15-23 Sand and clay, pink; 55 percent fine to very fine-grained angular quartz sand. 45 percent pink clay matrix, unconsolidated but tight.

23-35 Sand, yellow; 85 percent coarse to fine-grained subangular to subrounded poorly-sorted quartz sand. 15 percent yellow clay matrix, unconsolidated. Limonitic staining of quartz grains predominant.

35-50 Sand, yellow; Same as 23-35-foot interval.

Upper Cretaceous—Black Creek formation

50-80 Sand and clay, dark-gray; 40 percent fine to medium-grained angular to subangular quartz sand. 60 percent gray clay matrix, unconsolidated but tight. Marcasite aggregates prominent.

144-150 Sand and clay, black; 30 percent coarse to fine-grained subangular to angular poorly-sorted quartz sand. 70 percent black waxy micaceous clay matrix, very tight. Trace of fine-grained glauconite. Foraminifera very rare.

156-162 Sand, gray; 90 percent coarse to medium-grained subrounded quartz sand. 5 percent gray clay matrix, unconsolidated. 5 percent coarse blocky grains of potash feldspar.

Remarks: A few Foraminifera were present in the 144-150-foot interval and included:

Eouvigerina sp.
Bulimina sp.
Globigerina sp.
Gumbelina cf. *G. globulosa* (Ehrenberg) Egger

Robeson County

Number 3

Location: Hilly Branch School, 1.3 miles south of the junction of U. S. Routes 74 and 301.
Owner: Hilly Branch School
Date drilled: 1954
Driller: Heater Well Co.
Elevation of well: 155 feet above sea level

Hydrologic Information

Diameter of well: 4 inches
Depth of well: 125 feet
Cased to: 125 feet
Finish: Screen
Static (nonpumping) water level: 10 feet below land surface (reported 1954)
Yield: 20 gallons a minute (reported 1954)

Log of Well

Depth (feet)

0-10 No sample.

Post-Miocene—surficial clays and sands

10-25 Clay and sand, light-gray; 25 percent fine to very fine-grained angular quartz sand. 75 percent gray clay matrix, unconsolidated. Hematite staining of quartz grains prominent.

Upper Cretaceous—Black Creek formation

30-42 Sand, gray; 65 percent fine to medium-grained angular to subangular quartz sand. 35 percent gray clay matrix, unconsolidated. Trace of black lignitized plant remains and marcasite aggregates.

42-105 Clay, gray; 15 percent fine to very fine-grained angular quartz sand. 85 percent gray clay matrix, unconsolidated but very tight. Lignitized plant fragments prominent. Trace of marcasite aggregates. Foraminifera very rare. Very small dwarf forms of *Globigerina* sp., and *Gumbelina* sp. occur in the 42-105-foot interval.

Robeson County

Number 4

Location: Town well at Pembroke, North Carolina.
Owner: Town of Pembroke
Date drilled: 1955
Driller: Heater Well Co.
Elevation of well: 171 feet above sea level

Hydrologic Information

Diameter of well: 10 inches to 8 inches
Depth of well: 311 feet
Cased to: 250 feet
Finish: gravel wall and screens
Static (nonpumping) water level: Unknown
Yield: 700 gallons a minute.

Log of Well

Depth (feet)

Post-Miocene—surficial sands and clays

0-6 Sand and clay, mottled-tan to gray; 60 percent medium to coarse-grained subangular quartz sand. 40 percent mottled clay matrix, unconsolidated but very compact. No microfossils.

6-22 Sand, white; 95 percent coarse to medium-grained subangular quartz sand. 5 percent white clay matrix, unconsolidated. No microfossils.

22-31 Clay, gray; 10 percent fine to medium-grained angular quartz sand. 90 percent gray clay matrix, unconsolidated but very compact. No microfossils.

31-36 Sand, light-gray; 85 percent very coarse to medium-grained subrounded to subangular quartz sand. 15 percent light-gray clay matrix, unconsolidated. No microfossils.

Upper Miocene—Yorktown formation

36-54 Marl, light-gray; 20 percent coarse to fine-grained subrounded to angular quartz sand. 55 percent very coarse broken shell fragments. 25 percent gray clay matrix, unconsolidated. Ostracoda and Foraminifera common.

54-61 Clay, light-gray; 5 percent very fine-grained angular quartz sand. 95 percent gray waxy clay matrix, unconsolidated but very compact. Trace of fine broken shell fragments. Ostracoda and Foraminifera very rare.

Ostracoda from the 36-61-foot intervals include:
Puriana rugipunctata (Ulrich and Bassler)
Murrayina martini (Ulrich and Bassler)
Orionina vaughani (Ulrich and Bassler)
Hemicythere conradi Howe and McGuirt
Hemicythere confragosa Edwards
Cytheretta reticulata Edwards

Upper Cretaceous—Black Creek formation

61-88 Sand, white; 95 percent very coarse to medium-grained subrounded to subangular quartz sand. 5 percent white clay matrix, unconsolidated. Black lignitized wood fragments prominent. Trace of coarse mica flakes. No microfossils.

88-99	Sand and clay, gray; 65 percent medium to fine-grained subrounded to angular quartz sand. 35 percent gray clay matrix, unconsolidated but compact. No microfossils.
99-127	Sand, gray; 85 percent very coarse to medium-grained subrounded quartz sand. 15 percent light-gray clay matrix, unconsolidated. Trace of black lignitized wood fragments. No microfossils.
127-133	Clay and sand, light-gray; 40 percent medium to fine-grained subrounded to angular quartz sand. 60 percent gray micaceous clay matrix, unconsolidated but very compact. No microfossils.
133-140	Sand and clay, light-gray; 70 percent coarse to medium-grained subrounded to subangular quartz sand. 30 percent gray micaceous clay matrix, unconsolidated but compact. No microfossils.
140-154	Sand and clay, light-gray; Same as 133-140-foot interval. No microfossils.
154-176	Sand, light gray; 80 percent coarse to medium-grained subrounded to subangular quartz sand. 20 percent gray micaceous clay matrix, unconsolidated. No microfossils.
176-189	Sand, light-gray; Same as 154-176-foot interval. No microfossils.
189-205	Sand, light-gray; Same as 154-176-foot interval. No microfossils.
205-233	Sand and clay, gray; 75 percent medium to fine-grained subangular to angular quartz sand. 25 percent gray micaceous clay matrix, unconsolidated. Black lignitized wood fragments prominent.
233-250	Sand, gray; 90 percent coarse to medium-grained subrounded to subangular quartz sand. 10 percent gray micaceous clay matrix, unconsolidated. Trace of marcasite aggregates.
	Upper Cretaceous—Tuscaloosa formation
250-311	Sand and clay, pink; 60 percent coarse to medium-grained subangular quartz sand. 30 percent pink micaceous clay matrix. 5 percent red hematite aggregates. 5 percent coarse-grained potash feldspar.

Remarks: No microfossils were recovered from samples below 61 feet. Correlation of the Upper Cretaceous units is based on lithology and stratigraphic position.

Sampson County

Number 1

Location: Vann Farm on N. C. Route 403, 5 miles west of Faison, North Carolina.
Owner: Henry Vann
Date drilled: 1955
Driller: Heater Well Co.
Elevation of well: 166 feet above sea level

Hydrologic Information

Diameter of well: 10 inches
Depth of well: 240 feet
Cased to: 240 feet
Finish: gravel wall and screens (152-240 feet)
Static (nonpumping) water level: 42 feet below land surface (1955)
Yield: Tested at 500 gallons a minute with an 81-foot drawdown

Log of Well

Depth (feet)	
	Post-Miocene—surficial sands
0-37	Sand, yellow; 85 percent coarse to medium-grained subangular quartz sand. 15 percent yellow clay matrix, unconsolidated. Limonite staining of quartz grains predominate.
	Upper Cretaceous—Black Creek formation
37-71	Clay, black; 10 percent fine to very fine-grained angular quartz sand. 85 percent black micaceous clay matrix, very tight. 5 percent black lignitized wood fragments. Trace of fine grains of amber.
71-81	Clay, black; Same as 37-71-foot interval with traces of light-green weathered glauconite.
92-111	Sand and clay, black; 65 percent fine to medium-grained subangular quartz sand. 35 percent black micaceous clay matrix. Trace of lignitized wood and dark-green glauconite. Foraminifera very rare.
131-156	Clay, black; Same as 37-71-foot interval.
156-171	Sand and clay, black; Same as 92-111-foot interval.
171-181	Sand, gray; 80 percent coarse to medium-grained subangular quartz sand. 20 percent dark-gray clay matrix, unconsolidated. Trace of marcasite aggregates and black lignitized wood fragments.
187-181	Sand, gray; Same as 171-181-foot interval with trace of very fine-grained glauconite. Foraminifera very rare.
191-196	Sand, gray; Same as 171-181-foot interval.
196-201	Sand, gray; Same as 171-181-foot interval.
201-211	Sand, gray; Same as 171-181-foot interval.
211-224	Sand, gray; Same as 171-181-foot interval.
224-241	Clay, gray-green; weathered bedrock.
241-245	Clay, gray-green; weathered bedrock.
	basement roeks
245-271	Weathered schist, yellow to dark-brown.

Remarks: A few Foraminifera occur in the 92-111-foot interval and include *Bulimina* sp., *Globigerina* sp., and *Cibieides* sp.(?). In the 187-191-foot interval the occurrence of *Eouvigerina* sp., and *Globigerina* sp. was noted.

Sampson County

Number 2

Location: Well number 5 at town of Clinton.
Owner: Town of Clinton
Date drilled: May 1955
Driller: Heater Well Co.
Elevation of well: 157 feet above sea level

Hydrologic Information

Diameter of well: 24 inches to 10 inches at 77 feet
Depth of well: 435 feet, filled back to 385 feet
Cased to: 385 feet
Finish: gravel wall and screens
Static (nonpumping) water level: 36 feet (1955) below land surface
Yield Tested at 560 gallons a minute (1955)
Chemical analysis of water available

Log of Well

Depth (feet)	
	Post-Miocene—surficial sands and clays
0-29	Clay and sand, rust; 40 percent fine to very fine-grained angular quartz sand. 60 percent rust-colored clay matrix, unconsolidated. Limonitic staining of quartz component nearly 100 percent.
29-34	Sand and clay, rust; 75 percent fine to medium-grained angular quartz sand. 25 percent tan clay matrix, unconsolidated. Limonitic stained quartz predominant.
34-40	Sand and clay, rust; Same as 29-34-foot interval.
40-48	Sand, tan; 80 percent fine to medium-grained angular poorly-sorted quartz sand. 20 percent white to tan clay matrix, unconsolidated but compact. Limonitic stained quartz prominent.
48-54	Sand, tan; Same as 40-48-foot interval.
54-60	Sand, tan; Same as 40-48-foot interval.
	Upper Cretaceous—Black Creek formation
60-72	Sand and clay, gray; 65 percent coarse to fine-grained angular poorly-sorted abraded quartz sand. 35 percent black micaceous clay matrix, tight but unconsolidated. Trace of weathered glauconite.
72-80	Sand and clay, gray; Same as 60-72-foot interval.
80-88	Clay, black; 15 percent fine-grained angular quartz sand. 85 percent micaceous black clay matrix, very tight. Trace of weathered glauconite.
88-95	Sand, gray; 90 percent fine to very fine-grained angular quartz sand. 10 percent black clay matrix, unconsolidated. Dark-green glauconite grains and lignitized wood fragments prominent.
95-118	No sample.
118-129	Clay, black; 15 percent fine to very fine-grained angular quartz sand. 85 percent black micaceous clay matrix, very tight, with prominent lignitized plant remains interbedded. Dark-green fine-grained glauconite prominent. Trace of marcasite.
129-146	Sand, gray; 80 percent coarse to medium-grained subangular to subrounded quartz sand. 20 percent black micaceous clay matrix, unconsolidated. Trace of lignitized plant remains glauconite and marcasite.
146-153	Clay, black; 5 percent very fine-grained angular quartz sand. 95 percent black micaceous clay matrix, very tight. Lignitized fragments prominent. Trace of glauconite and marcasite.

153-160 Sand, gray; 90 percent coarse to medium-grained subrounded quartz sand. 10 percent black micaceous clay matrix, unconsolidated. Trace of weathered glauconite and lignitized wood fragments.

160-191 Sand, gray; Same as 153-160-foot interval with 5 percent increase in clay matrix.

191-218 Clay and sand, black; 25 percent fine to medium-grained angular to subangular quartz sand. 75 percent black micaceous clay matrix, unconsolidated. Trace of glauconite and marcasite.

218-236 Clay, gray; 5 percent very fine-grained angular quartz sand. 95 percent dark-gray clay matrix very tight. Trace of black lignitized wood and fresh glauconite.

Upper Cretaceous—Tuscaloosa formation (?)

236-248 Sand and clay, mottled-red; 60 percent coarse to fine-grained poorly-sorted subangular quartz sand. 40 percent mottled-red clay matrix, tight.

248-256 Sand and clay, gray; 65 percent coarse to fine-grained subrounded to subangular quartz sand. 35 percent gray micaceous clay matrix.

260-263 Sand and clay, gray; Same as 248-256-foot interval with 10 percent of quartz in fine gravel size-range.

276-288 Sand, gray; 85 percent coarse to fine-grained poorly-sorted subangular quartz sand. 15 percent micaceous clay matrix, unconsolidated. Trace of marcasite aggregates.

288-296 Sand, gray; Same as 276-288-foot interval. Trace of glauconite and slight increase in amount of marcasite aggregates.

296-314 Sand, gray; Same as 288-296-foot interval with a few pink sandstone fragments.

314-323 Sand, gray; Same as 288-296-foot interval, with a 5 percent increase in clay matrix.

323-344 Sand, gray; 90 percent fine to very fine-grained subangular water-polished quartz sand. 10 percent gray micaceous clay matrix, unconsolidated. Marcasite aggregates prominent. Trace of glauconite.

344-374 Sand, gray; 90 percent fine to very fine-grained angular quartz sand. 10 percent gray clay matrix, unconsolidated. Black lignitized wood fragments glauconite and marcasite aggregates prominent.

374-394 Sand, gray; 75 percent coarse to medium-grained abraded quartz sand. 15 percent blocky potash feldspar grains. 10 percent gray clay matrix, unconsolidated. Trace of marcasite aggregates.

408-435 Sandstone and shale, interbedded, red, tan, and green; 65 percent shale, 35 percent sandstone. Thickness of shale beds apparently more than that of the sandstone beds based upon percentage of fragments in sample. Siderite pellets common.

Remarks: No microfossils were observed in any but the 191-218-foot interval. This interval yielded *Gumbelina* sp. aff. *G. reussi*, *Gumbelina* sp. aff. *G. globulosa*, *Globigerina* sp., *Anomalina* sp., *Globorotalia* sp., and several arenaceous forms of uncertain generic position. The top of the Tuscaloosa formation is picked on the basis of lithology and stratigraphic position.

Sampson County

Number 3

Location: Ellis farm, 4.6 miles northwest of Clinton, North Carolina, on an unnumbered county road, 1.3 miles north of the bridge where U. S. Route 421 crosses Coharie Creek.
Owner: J. F. Ellis
Date drilled: 1955
Driller: Heater Well Co.
Elevation of well: 163 feet above sea level

Hydrologic Information

Diameter of well: 12 inches
Depth of well: 241 feet
Cased to: 228 feet
Finish: gravel wall and screens (78-228 feet)
Static (nonpumping) water level: 41 feet below land surface (1955)
Yield: Tested at 200 gallons a minute with a 79-foot drawdown (1955)

Log of Well

Depth (feet)

Post-Miocene—surficial sands

0-7 Sand, white; 95 percent medium-grained subangular quartz sand. 5 percent white silt and clay matrix unconsolidated.

7-16 Sand, white; Same as 0-7-foot interval.

16-21 Sand, yellow; Same as 7-16-foot interval with limonite staining prominent.

21-31 Sand, yellow; Same as 16-21-foot interval.

Upper Cretaceous—Black Creek formation

35-38 Clay, black; 10 percent fine to very fine-grained angular quartz sand. 85 percent black micaceous clay matrix, tight. 5 percent lignitized wood and plant remains.

38-41 Sand, gray; 90 percent medium to fine-grained angular quartz sand. 10 percent black clay matrix, unconsolidated. Trace of dark-green fine-grained glauconite.

41-51 Sand, dark-gray; 80 percent medium to fine-grained angular quartz sand. 10 percent black clay matrix, unconsolidated. 10 percent lignitized wood fragments. Trace of glauconite.

51-59 Sand, dark-gray; Same as 41-51-foot interval.

59-74 Sand, dark-gray; Same as 41-51-foot interval with a slight increase in quartz sand.

74-81 Sand and clay, gray; 70 percent fine-grained angular quartz sand. 25 percent black micaceous clay matrix, unconsolidated. 5 percent lignitized wood and plant remains. Trace of dark-green fine-grained glauconite.

81-85 Clay, black; 20 percent fine-grained angular quartz sand. 80 percent black micaceous clay matrix, tight. Trace of glauconite.

85-93 Clay, black; Same as 81-85-foot interval.

97-101 Clay, black; Same as 81-85-foot interval.

101-111 Clay, black; Same as 81-85-foot interval.

111-124 Clay, black; Same as 81-85-foot interval.

124-131 Clay, black; Same as 81-85-foot interval.

131-141 Clay, black; Same as 81-85-foot interval.

151-158 Clay and sand, gray; 25 percent fine-grained angular quartz sand. 75 percent gray micaceous clay matrix, tight. Marcasite aggregates and lignitized wood fragments prominent. Trace of glauconite.

158-161 Clay and sand, gray; Same as 151-158-foot interval.

161-171 Clay and sand, gray; Same as 151-158-foot interval.

171-176 Sand, gray; 80 percent coarse to fine-grained angular quartz sand. 20 percent gray clay matrix, unconsolidated.

176-181 Sand, gray; Same as 171-176-foot interval.

181-241 Sand, gray; Same as 171-176-foot interval.

Remarks: No microfossils were observed in the intervals examined. Correlation is based on lithology and stratigraphic position.

Sampson County

Number 4

Location: Town of Roseboro, North Carolina.
Owner: Town of Roseboro
Date drilled: 1955
Driller: Layne Atlantic Co.
Elevation of well: 134 feet above sea level

Hydrologic Information

Diameter of well: 18 inches
Depth of well: 470 feet
Cased to: 338 feet
Finish: gravel wall and screens.
Static (nonpumping) water level: 72 feet below land surface (1955)
Yield: Tested at 300 gallons a minute.
Chemical analysis of water available

Log of Well

Depth (feet)

Post-Miocene—surficial sands and clays

0-18 Clay, red; 20 percent fine to very fine-grained angular quartz sand. 80 percent red clay matrix, tight. Trace of hematite aggregates in matrix.

18-37 Sand, tan to yellow; 90 percent coarse to medium-grained angular abraded quartz sand. Limonitic staining of quartz predominant. 10 percent yellow clay matrix, unconsolidated. Trace of fine-grained ilmenite.

Upper Cretaceous—Black Creek formation

37-57 Clay, black; 95 percent black plastic clay. 5 percent lignitized wood fragments mica flakes and marcasite aggregates. Trace of fibrous gypsum.

57-64 Sand, gray; 90 percent coarse to medium-grained subangular quartz sand. 10 percent black clay matrix. Trace of lignitized

plant remains and marcasite aggregates. Trace of light-green weathered glauconite.

67-137 Clay, black; 5 percent fine-grained angular quartz sand. 90 percent black plastic clay, tight. 5 percent lignitized wood and plant remains mica flakes and marcasite aggregates. Trace of light-green glauconite.

137-143 Sand, gray; 90 percent coarse to medium-grained subangular quartz sand. 75 percent gray clay matrix, tight. 5 percent fine mica flakes. Trace of light-green glauconite.

143-199 Clay, dark-gray; 20 percent fine to very fine-grained angular quartz sand. 75 percent gray clay matrix, tight unconsolidated. 5 percent fine mica flakes. Trace of light-green glauconite.

190-205 Clay and sand, brown; 35 percent fine-grained angular quartz sand. 65 percent brown micaceous clay matrix, tight. Trace of light-green glauconite.

205-214 Sand, gray; 85 percent fine to coarse-grained poorly-sorted angular quartz sand. 15 percent drab-gray clay matrix, unconsolidated. Fine-grained ilmenite prominent.

214-220 Same as 190-205-foot interval.

236-241 Sand, white; 95 percent fine to medium-grained angular quartz sand. 5 percent gray clay matrix, unconsolidated.

241-266 Clay and sand, drab-black; 40 percent fine-grained angular quartz sand. 55 percent black plastic clay matrix, tight. 5 percent mica flakes marcasite aggregates and fibrous gypsum. Trace of glauconite.

266-273 Sand, white; 90 percent fine to medium-grained angular quartz sand. 10 percent gray clay matrix, unconsolidated. Trace of dark-green fine-grained glauconite.

Upper Cretaceous—Tuscaloosa formation (?)

273-292 Clay and sand, brown to green; 35 percent fine-grained angular quartz sand. 65 percent micaceous clay matrix, tight.

292-323 Sand, gray; 95 percent coarse to fine-grained angular poorly-sorted quartz sand. 5 percent gray clay matrix, unconsolidated. Trace of marcasite aggregates.

323-328 Clay and sand, red; 25 percent fine to medium-grained subangular quartz sand. 70 percent red clay matrix, very tight. 5 percent brown siderite pellets.

328-353 Gravel, red to brown; 85 percent coarse angular quartz gravel with minor amounts of pyroclastic fragments. 10 percent coarse to medium-grained quartz sand. 5 percent coarse to fine-grained siderite pellets. Hematite staining predominant. No discernible matrix.

basement rocks

353-373 Weathered gneiss.

373-420 Unweathered granite gneiss, green.

Remarks: No microfossils were obtained from the intervals examined and correlation is based on lithology.

Sampson County

Number 5

Location: Town well number 2 at Garland, North Carolina.
Owner: Town of Garland
Date drilled: 1955
Driller: Carolina Well Drilling Co.
Elevation of well: 139 feet above sea level

Hydrologic Information

Diameter of well: 12 inches
Depth of well: 348 feet
Cased to: 348 feet
Finish: gravel wall and slotted casing
Static (nonpumping) water level: 62.73 feet below land surface (March 30, 1955)
Yield: Tested at 300 gallons a minute with a 32-foot drawdown (1955)
Chemical analysis of water available

Log of Well

Depth (feet)

Post-Miocene—surficial sand

0-22 Sand, rust; 90 percent coarse to medium-grained subrounded to subangular quartz sand. 10 percent rust-colored silt and clay matrix, unconsolidated. Limonitic staining of quartz grains predominant. No microfossils.

Upper Cretaceous—Black Creek formation

22-29 Clay, light-gray; 10 percent fine to very fine-grained angular quartz sand. 90 percent gray clay matrix, very tight. No Ostracoda, Foraminifera very rare.

42-52 Sand, white; 95 percent coarse to fine-grained poorly-sorted subrounded to angular quartz sand. 5 percent white clay matrix, unconsolidated. No Ostracoda, Foraminifera very rare.

52-62 Sand, dark-gray; 85 percent coarse to medium-grained subrounded quartz sand. 15 percent black clay matrix, unconsolidated. Trace of dark-green fine-grained glauconite. No microfossils.

104-113 Clay and sand, gray; 25 percent medium to fine-grained subangular quartz sand. 75 percent black micaceous clay matrix, unconsolidated but tight. Marcasite aggregates prominent. Trace of dark-green glauconite. No Ostracoda, Foraminifera very rare.

150-160 Clay and sand, dark-gray; Same as 104-113-foot interval with slight increase in percentage of marcasite aggregates. Trace of dark-green glauconite.

160-180 Clay and sand, dark-gray; Same as 104-113-foot interval. Trace of dark-green glauconite. No microfossils.

180-184 Clay, black; 10 percent fine to very fine-grained angular quartz sand. 90 percent black micaceous clay matrix, very tight. Trace of dark-green glauconite. No microfossils.

205-235 Sand and clay, dark-gray; 75 percent medium to fine-grained subrounded to subangular quartz sand. 25 percent dark-gray micaceous clay matrix, unconsolidated. Trace of dark-green glauconite. No Ostracoda, Foraminifera very rare.

235-247 Sand and clay, dark-gray; Same as 205-235-foot interval. Trace of dark-green glauconite. No Ostracoda, Foraminifera very rare.

247-348 No sample.

Remarks: No Ostracoda were found in the cuttings from this well. A few dwarf Foraminifera including *Globulina* sp., *Globigerina* sp., *Anomalina* sp., and *Gumbelina* sp. occur in the samples as indicated. Correlation is based on lithology and stratigraphic position.

Scotland County

Number 1

Location: Well number 1 at Maxton Glider School, 3 miles northwest of Maxton, North Carolina.
Owner: U. S. Army
Date drilled: 1942
Driller: Virginia Machinery and Well Co.
Elevation of well: 208 feet above sea level

Hydrologic Information

Diameter of well: 8 inches
Depth of well: drilled to 448 feet filled back to 156 feet
Cased to: 156 feet
Finish: Screened from 126-156-feet
Static (nonpumping) water level: 29 feet below land surface (1942)
Yield: 300 gallons a minute with a 48-foot drawdown (1942)

Log of Well

Depth (feet)

0-47 No sample.

Upper Cretaceous—Tuscaloosa formation

47-52 Sand and clay, tan; 75 percent fine to very fine-grained angular quartz sand. 25 percent tan silt and clay matrix, loosely consolidated. Ilmenite and mica flakes prominent.

70-74 Clay, white; 10 percent fine-grained subangular quartz sand. 90 percent white to gray chalky-clay matrix, loosely consolidated but tight.

77-87 Clay, white; Same as 70-74-foot interval.

137-144 Sand and clay, gray; 75 percent coarse to medium-grained subangular abraded quartz sand. 25 percent gray clay matrix, unconsolidated.

144-156 Sand and clay, gray; Same as 137-144-foot interval.

156-159 Sand and clay, gray; Same as 144-156-foot interval with 10 percent increase in clay fraction.

180-183 Sand and clay, gray; Same as 156-159-foot interval.

193-200 Clay tan; 5 percent medium-grained subangular quartz sand. 95 percent tan micaceous clay matrix, very tight.

216-220 Sand, gray; 85 percent coarse-grained subangular quartz sand. 15 percent gray clay matrix, unconsolidated.

230-237 Sand and clay, gray; 70 percent coarse to medium-grained sub-

angular quartz sand. 30 percent gray clay matrix, unconsolidated.

243-247 Clay, red; 5 percent fine-grained angular quartz sand. 95 percent red clay matrix, unconsolidated but very tight.

250-255 Clay and sand, tan; 25 percent fine to very fine-grained angular quartz sand. 75 percent tan clay matrix, unconsolidated but tight.

276-281 Clay and sand, pink; 35 percent fine to medium-grained subangular quartz sand. 65 percent pink clay matrix, unconsolidated.

304-309 Clay and sand, tan; Same as 276-281-foot interval with a change in color.

314-320 Clay and sand, tan; Same as 304-309-foot interval.

350-362 Silt, yellow; 10 percent fine to medium-grained angular quartz sand. 90 percent yellow silt matrix, unconsolidated.

basement rocks

363-367 Weathered schist, light-gray to gray-green; Shows strong degree of decomposition to clay and free micas.

409-415 Schist, gray-green.

425-430 Schist, gray-green.

440-445 Schist, gray-green.

Washington County

Number 1

Location: State Forest Service fire tower at Wenona, North Carolina.
Owner: State Forest Service
Date drilled: 1954
Driller: Truman Sawyer
Elevation of well: 17.5 feet above sea level

Hydrologic Information

Diameter of well: 2 inches
Depth of well: 250 feet
Cased to: 235 feet
Finish: open end
Static (nonpumping) water level: 2 feet above land surface (1954)
Yield: 4 gallons per minute (flow)
Temperature: 62°F
Chemical analysis of water available

Log of Well

Depth (feet)

0-10 No sample.

Post-Miocene—surficial sands

10-20 Sand, gray; 80 percent fine-grained angular well-sorted quartz sand. 20 percent gray silt and clay matrix, unconsolidated. Fine-grained ilmenite prominent. Trace of coarse mica flakes. No microfossils.

20-30 Sand, gray; Same as 10-20-foot interval. No microfossils.

30-40 Sand, gray; Same as 10-20-foot interval. No microfossils.

40-50 Sand, gray; 85 percent fine to medium-grained angular to subangular quartz sand. 15 percent gray clay matrix, unconsolidated. Trace of broken abraded shell fragments and fine-grained glauconite. No Ostracoda, Foraminifera very rare.

Upper Miocene—Yorktown formation

50-60 Marl, gray; 40 percent medium to fine-grained subrounded to subangular quartz sand. 35 percent broken shell fragments. 25 percent blue-gray clay matrix, unconsolidated but compact. Trace of fine-grained glauconite and phosphate. Ostracoda and Foraminifera rare.

60-80 Marl, gray; Same as 50-60-foot interval. Ostracoda and Foraminifera common.

80-90 Sand, gray; 55 percent fine to medium-grained subangular quartz sand. 30 percent blue-gray clay matrix, unconsolidated but very compact. 15 percent fine broken shell fragments. Trace of light-green fine-grained glauconite. Ostracoda and Foraminifera common.

90-100 Sand, gray; Same as 80-90-foot interval. Ostracoda and Foraminifera common.

100-110 Marl, gray; 30 percent medium to fine-grained subangular to angular quartz sand. 35 percent fine broken shell fragments. 30 percent blue-gray clay matrix, unconsolidated but compact. 5 percent dark-green fine-grained glauconite. Trace of fine-grained phosphate and coarse mica flakes.
Ostracoda and Foraminifera abundant.

110-120 Marl, gray; Same as 100-110-foot interval. Ostracoda and Foraminifera abundant.

120-140 Marl, gray; Same as 100-110-foot interval. Ostracoda and Foraminifera abundant.

140-150 Marl, gray; 15 percent fine-grained angular quartz sand. 35 percent fine broken shell fragments. 50 percent blue-gray clay matrix, unconsolidated but very compact. Trace of glauconite phosphate and mica flakes. Ostracoda and Foraminifera abundant.

150-160 Marl, gray; Same as 140-150-foot interval. Ostracoda and Foraminifera common.

160-170 Marl, gray; Same as 140-150-foot interval. Ostracoda and Foraminifera common.

170-180 Sand, gray; 70 percent fine-grained angular to subangular quartz sand. 20 percent blue-gray clay matrix, unconsolidated. 10 percent coarse to fine broken shell fragments. Ostracoda and Foraminifera common.

180-190 Sand, gray; Same as 170-180-foot interval. Ostracoda and Foraminifera common.

190-200 Marl, gray; 20 percent fine-grained subangular to angular quartz sand. 50 percent fine to coarse-broken shell fragments. 30 percent blue-gray clay matrix, unconsolidated but compact. Ostracoda and Foraminifera common.

200-220 Marl, gray; Same as 190-200-foot interval. Ostracoda and Foraminifera common.
Ostracoda from the 50-200-foot intervals include:
Paracytheridea vandenboldi Puri
Paracytheridea (?) cf. *P. wetherellii* (Jones)
Leguminocythereis whitei Swain
Puriana rugipunctata (Ulrich and Bassler)
Murrayina martini (Ulrich and Bassler)
Orionina vaughani (Ulrich and Bassler)
Hemicythere conradi Howe and McGuirt
Loxoconcha purisubrhomboidea Edwards
Middle Eocene—lower part of Castle Hayne limestone

230-240 Shell limestone, white; 20 percent medium-grained subangular quartz sand. 80 percent white shell fragments and calcareous matrix, indurated and very compact. Ostracoda and Foraminifera very rare, partially recrystallized.

240-250 Shell limestone, white; Same as 230-240-foot interval with trace of chlorite and dark-green glauconite. Ostracoda and Foraminifera very rare, partially recrystallized.

Ostracoda occurring in the 230-240-foot intervals include:
Cytherura sp. aff. *C. washburni* (Stephenson)
Pterygocythereis washingtonensis Swain
Actinocythereis hilgardi (Howe and Garrett)
Buntonia (?) cf. *B. lacunosa* (Jones)

Washington County

Number 2

Location: Bagley Farm, ½ mile west of Plymouth on U. S. Route 64.
Owner: Alton Bagley
Driller: Hudson Well Co.
Date drilled: 1953
Elevation of well: 19.5 feet above sea level

Hydrologic Information

Diameter of well: 2 inches
Static (nonpumping) water level: 4 feet below land surface (1953)
Depth of well: 160 feet
Yield: Unknown
Cased to: 160 feet
Finish: open end

Log of Well

Depth (feet)

Post-Miocene—surficial sands

0-25 Sand, tan; 80 percent medium to fine-grained subrounded quartz sand. 20 percent tan clay matrix, unconsolidated. Trace of fine mica flakes. Limonitic staining of quartz grains prominent. No microfossils.

25-45 Sand, tan; Same as 0-20-foot interval. No microfossils.

Upper Miocene—Yorktown formation

45-65 Marl, gray; 45 percent medium to fine-grained angular quartz sand. 30 percent fine broken shell fragments. 25 percent blue-gray clay matrix, unconsolidated. Ostracoda and Foraminifera common.

65-80 Sand, gray; 80 percent medium-grained subrounded well-sorted quartz sand. 20 percent gray clay matrix, unconsolidated. Trace of dark-green glauconite and broken shell fragments. Ostracoda and Foraminifera abundant.

80-95 Marl, gray; 60 percent fine to medium-grained angular to subangular quartz sand. 25 percent fresh broken shell fragments. 15 percent blue-gray clay matrix, unconsolidated. Trace of dark-green glauconite and black phosphate. Ostracoda and Foraminifera common.

95-120 Marl, gray; Same as 80-95-foot interval. Ostracoda and Foraminifera abundant.

Ostracoda from the 45-120-foot intervals include:
Paracytheridea (?) *wetherellii* (Jones)
Cytheropteron cf. *C. subretieulatum* van den Bold
Puriana rugipunctata (Ulrich and Bassler)
Actinocythereis exanthemata (Ulrich and Bassler)
Hemicythere conradi Howe and McGuirt
Cytheromorpha curta Edwards

Middle Eocene—lower part of Castle Hayne limestone

120-160 Shell limestone, white; 10 percent medium-grained subangular quartz sand. 25 percent broken recrystallized shell fragments. 65 percent white limestone matrix, very hard but porous. Dark-green medium-grained glauconite prominent. No Ostracoda, recrystallized Foraminifera very rare.

Remarks: No Ostracoda were recovered from samples below 120-feet. The limestone interval from 120-160-feet is placed in the lower part of the Castle Hayne limestone of middle Eocene age on the basis of lithology and stratigraphic position.

Wayne County

Number 1

Location: Test hole at city of Goldsboro water plant.
Owner: City of Goldsboro
Driller: Layne Atlantic Co.
Date drilled: 150
Elevation of well: 75 feet above sea level

Hydrologic Information

Diameter of well: 8 inches
Static (nonpumping) water level: 8 feet below land surface (1950)
Depth of well: 110 feet
Yield: Tested at 100 gallons a minute
Cased to: 110 feet
Finish: screens

Log of Well

Depth (feet)

Post-Miocene—surficial sand and clay

0-5 Sand and clay, tan; 65 percent coarse to fine-grained subangular to angular quartz sand. 35 percent tan clay and silt matrix, unconsolidated. Limonitic staining of quartz grains prominent.

5-13 Sand, tan; 75 percent coarse to medium-grained subangular quartz sand. 10 percent coarse-grained blocky potash feldspar. 15 percent tan clay matrix, unconsolidated. Limonitic staining of quartz grains predominent.

Upper Cretaceous—Tuscaloosa formation

13-33 Sand and clay, light-gray; 55 percent medium to fine-grained subrounded quartz sand. 45 percent gray micaceous clay matrix, unconsolidated but tight.

33-37 Sand and clay, light-gray; 75 percent very fine to fine-grained angular well-sorted quartz sand. 25 percent gray micaceous clay matrix, unconsolidated. Trace of black lignitized wood fragments.

37-45 Clay and sand, mottled-pink and yellow; 25 percent fine to very fine-grained angular quartz sand. 75 percent pink to yellow micaceous clay matrix, unconsolidated but tight. Trace of red hematite aggregates.

45-57 Clay and sand, pink; 25 percent fine-grained angular quartz sand. 70 percent pink micaceous clay matrix, unconsolidated but tight. 5 percent red hematite aggregates.

57-63 Sand and clay, yellow; 60 percent fine to medium-grained subangular quartz sand. 40 percent yellow micaceous clay matrix, unconsolidated. Limonitic staining of quartz grains predominant.

63-68 Sand and clay, yellow; Same as 57-63-foot interval.

68-82 Sand and gravel, gray; 60 percent coarse to medium-grained subrounded to subangular quartz sand. 10 percent coarse-grained potash feldspar. 25 percent shot-size gravel and rounded pebbles. 5 percent gray clay matrix, unconsolidated.

82-90 Clay and sand, yellow; 35 percent medium to fine-grained subangular quartz sand. 65 percent yellow micaceous clay matrix, unconsolidated. Rose quartz pebbles prominent.

90-93 Sand and clay, yellow; 70 percent coarse to medium-grained subangular quartz sand. 25 percent yellow clay matrix, unconsolidated but tight. 5 percent rose quartz pebbles.

basement rock

93-133 Green schist, very hard and unweathered.

Remarks: No microfossils were obtained from the cuttings in this well. Correlation is based on lithology and stratigraphic position.

Wayne County

Number 2

Location: Town of Mt. Olive in city park at eastern edge of town.
Owner: Town of Mt. Olive
Driller: Heater Well Co.
Date drilled: 1953
Elevation of well: 155 feet above sea level

Hydrologic Information

Diameter of well: 12 inches
Static (nonpumping) water level: 22 feet below land surface (1953)
Depth of well: 310 feet
Yield: Tested at 700 gallons a minute with a 42-foot drawdown.
Cased to: 308 feet
Finish: gravel wall and screens
Chemical analysis of water available

Log of Well

Depth (feet)

Post-Miocene—surficial clays and sands

0-13 Clay and sand, tan; 30 percent very fine-grained angular quartz sand. 70 percent tan clay matrix, unconsolidated.

Upper Cretaceous—Black Creek formation

17-25 Sand and clay, black; 60 percent coarse to medium-grained subrounded quartz sand. 40 percent black clay matrix, unconsolidated. Trace of light-green weathered glauconite.

25-36 Sand and clay, black; Same as 17-25-foot interval, with less than 2 percent as coarse well-rounded gravel.

36-41 Clay and sand, black; 30 percent coarse to medium-grained subrounded quartz sand. 70 percent black to gray clay matrix, unconsolidated but tight.

41-54 Sand and clay; black; 60 percent coarse to medium-grained subrounded quartz sand. 40 percent gray to black clay matrix, unconsolidated but tight.

54-56 Sand, gray; 80 percent coarse-grained subrounded quartz sand. 20 percent gray silt and clay matrix. Dark-green fine-grained glauconite prominent.

56-60 Sand and gravel, gray; 30 percent very coarse-grained subrounded quartz sand. 50 percent well-rounded pea-size gravel. 20 percent gray clay matrix, unconsolidated. Many fragments of white sandy limestone in this sample which are of Eocene age indicating contamination from farther up the hole, possible the 13-17-foot interval, the sample of which is missing.

60-64 Clay and sand, gray; 40 percent coarse to medium-grained subrounded quartz sand. 60 percent gray clay matrix, unconsolidated. Glauconite prominent. Trace of pyrite black phosphate and black lignitized wood fragments.

67-71 Clay and sand, gray; Same as 60-64-foot interval.

71-91 Clay and sand, gray; Same as 60-64-foot interval. Trace of broken and abraded shell fragments.

91-97 Clay and sand, gray; Same as 60-64-foot interval becoming somewhat less sandy with depth. Selenite crystals prominent.

97-99 Clay and sand, gray; Same as 91-97-foot interval.

101-133 Clay and sand, gray; Same as 91-97-foot interval.

133-140 Sand, gray; 80 percent coarse to medium-grained subrounded quartz sand. 20 percent gray clay matrix, unconsolidated.

Glauconite and selenite prominent. Trace of marcasite and black lignitized wood fragments.

140-143 Sand, gray, 90 percent coarse to medium-grained subrounded quartz sand. 10 percent gray clay matrix, unconsolidated. Trace of marcasite and black lignitized wood fragments.

143-147 Same as 140-143-foot interval.

147-165 Clay, black; 20 percent coarse to medium-grained subangular quartz sand. 80 percent black clay matrix, unconsolidated but tight. Trace of marcasite and black lignitized plant remains.

165-180 Sand, gray; 90 percent coarse-grained subangular quartz sand. 10 percent black clay matrix, unconsolidated. Dark-green fine-grained glauconite prominent. Trace of marcasite aggregates and lignitized wood fragments.

180-190 Sand, gray: Same as 165-180-foot interval.

190-198 Clay and sand, gray; 30 percent coarse-grained subangular quartz sand. 60 percent gray clay matrix, unconsolidated but tight. 10 percent marcasite aggregates. Trace of lignitized wood fragments.

198-226 Sand, gray; 90 percent coarse-grained subangular quartz sand. 10 percent black clay matrix, unconsolidated. Trace of marcasite and lignitized wood fragments.

226-228 Sand, gray; Same as 198-226-foot interval.

Upper Cretaceous—Tuscaloosa formation

228-236 Sand, white, 80 percent medium to coarse-grained subrounded quartz sand. 20 percent silt and clay matrix, unconsolidated.

236-240 Sand, white; Same as 228-236-foot interval.

240-265 Sand, white; Same as 228-236-foot interval.

265-300 Sand, white; Same as 228-236-foot interval.

300-310 Sand and clay, gray; 70 percent coarse to medium-grained quartz sand. 30 percent gray clay matrix, unconsolidated.

Remarks: A few Eocene Foraminifera occur in the sample of the Black Creek at 56-feet indicating contamination from above. No formational unit younger than the Black Creek was recognizable above 17-feet on the basis of lithology. A few microfossils occur in the Black Creek interval between 101-133-feet. They include *Cibicides* sp., *Anomalina* sp., and *Bolivina* sp. No attempt was made at further identification. The separation of the Black Creek and Tuscaloosa formations is based on lithology and stratigraphic position.

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Brachycythere bernardi Murray and Hussey 60
Brachycythere jessupensis Howe and Garrett 60
Brachycythere marylandica (Ulrich) 60

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Brachycythere interrasilis Alexander 60
Brachycythere cf. *B. verrucosa* Harris and Jobe 60
Brachycythere formosa Alexander 61
Brachycythere rhomboidalis (Berry) 61
Brachycythere nausiformis Swain 61
Brachycythere sphenoides (Reuss) 61
Brachycythere ledaforma (Israelsky) 61
Brachycythere raleighensis Brown 61
Brachycythere plena Alexander 61
Genus Alatacythere Murray and Hussey, 1942 61
Alatacythere alata atlantica (Schmidt) 61
Alatacythere lennicata (Alexander) 61
Alatacythere sp. aff. *A. gulfensis* (Alexander) 61
Alatacythere ivani Howe 62
Subfamily Trachyleberinae Sylvester-Bradley, 1948 62
Genus Trachyleberis Brady, 1898 62
Trachyleberis rukasi (Gooch) 62
Trachyleberis sp. *A* 62
Trachyleberis sp. *B* 62
Trachyleberis sp. *C* 62
Trachyleberis montgomeryensis (Howe and Chambers) 62
Trachyleberis broussardi (Howe and Chambers) 62
Trachyleberis pellucinoda Swain 62
Trachyleberis bassleri (Ulrich) 62
Trachyleberis communis aquia (Schmidt) 62
Trachyleberis spiniferrima (Jones and Sherborn) 62
Trachyleberis midwayensis (Alexander) 63
Trachyleberis pidgeoni (Berry) 63
Trachyleberis gapensis (Alexander) 63
Trachyleberis communis (Israelsky) 63
Trachyleberis (?) *praeeursora* Brown 63
Trachyleberis prestwichiana (Jones and Sherborn) 63
Genus Leguminocythereis Howe, 1936 63
Leguminocythereis scarabaeus Howe and Law 63
Leguminocythereis whitei Swain 63
Genus Puriana Coryell and Fields, 1953 63
Puriana rugipunctata (Ulrich and Bassler) 63
Genus Pterygocythereis Blake, 1933 64
Pterygocythereis washingtonensis Swain 64
Genus Platycythereis Triebel, 1940 64
Platycythereis costatana angula (Schmidt) 64
Genus Velarocythere Brown, 1957 64
Velarocythere scuffeltonensis Brown 64
Velarocythere arachoides (Berry) 64
Velarocythere legrandi Brown 64
Velarocythere cacumenata Brown 64
Velarocythere eikonata Brown 64
Genus Actinocythereis Puri, 1953 64
Actinocythereis exanthemata (Ulrich and Bassler) 64
Actinocythereis mundorffi (Swain) 64
Actinocythereis davidwhitei (Stadnichenko) 64
Actinocythereis siegristae (Schmidt) 65
Actinocythereis stenzeli (Stephenson) 65
Actinocythereis hilgardi (Howe and Garrett) 65
Genus Echinocythereis Puri, 1953 65
Echinocythereis evax (Ulrich and Bassler) 65
Echinocythereis garretti (Howe and McGuirt) 65
Echinocythereis planibasilis (Ulrich and Bassler) 65
Genus Murrayina Puri, 1953 65
Murrayina martini (Ulrich and Bassler) 65
Genus Orionina Puri, 1953 65
Orionina vaughani (Ulrich and Bassler) 65
Subfamily Hemicytherinae Puri, 1953 65
Genus Hemicythere Sars, 1925 65
Hemicythere conradi Howe and McGuirt 65
Hemicythere confragosa Edwards 66
Hemicythere laevicula Edwards 66
Hemicythere schmidtae Malkin 66
Subfamily Loxoconchinae Sars, 1925 66
Genus Loxoconcha Sars, 1866 66
Loxoconcha purisubrhomboidea Edwards 66
Loxoconcha reticularis Edwards 66
Loxoconcha creolensis Howe and Chambers 66
Loxoconcha jacksonensis Howe and Chambers 66
Loxoconcha claibornensis Murray 66
Loxoconcha seraphae Brown 66

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Loxoconcha neusensis Brown 66
Loxoconcha sp. *A* 66
Loxoconcha cf. *L. corrugata* Alexander 66
Genus Cytheromorpha Hirschman, 1909 66
Cytheromorpha cf. *C. cocenica* Stephenson 66
Cytheromorpha sp. aff. *C scrobiculata* Alexander 67
Cytheromorpha warneri Howe and Spurgeon 67
Subfamily Cytherettinae Triebel, 1952 67
Genus Cytheretta Muller, 1894 67
Cytheretta alexanderi Howe and Chambers 67
Cytheretta reticulata Edwards 67
Genus Basslerites Howe, 1937 67
Basslerites giganticus Edwards 67
Subfamily Cytherideidnae Puri, 1952 67
Genus Cushmanidea Blake, 1933 67
Cushmanidea ashermani (Ulrich and Bassler) 67
Subfamily Bythocytherinae Sars, 1926 67
Genus Monoceratina Roth, 1928 67
Monoceratina alexanderi Howe and Chambers 67
Genus Orthonotacythere Alexander, 1933 67
Orthonotacythere cristata Alexander 67
Orthonotacythere hannai (Israelsky) 67
Orthonotacythere tarensis Brown 67
Orthonotacythere sulcata Brown 68
Subfamily Eucytherinae Puri, 1954 68
Genus Eucythere Brady, 1868 68
Eucythere triordinis Schmidt 68
Subfamily (?) 68
Genus Buntonia Howe, 1935 68
Buntonia howei (Stephenson) 68
Buntonia cf. *B. lacunosa* (Jones) 68
Genus Protocythere Triebel, 1938 68
Protocythere paratriplicata Swain 68

Description of Ostracoda

Order	Ostracoda	Latreille, 1802
Suborder	Platycopa	Sars, 1866
Family	Cytherellidae	Sars, 1866
Genus	Cytherella	Jones, 1849

Cytherella ovata (Roemer)

Plate 1, Figure 1

Cytherina ovata Roemer; 1840, Verstein norddeutsch. Kreidegeb, p. 104, pl. 16, fig. 21.

Cytherella ovata (Roemer) Jones, 1849, Monogr. Cret. Entomostraca England; Palaeontographical Soc. London, p. 28, pl. 7, figs. 24a-i. Jones and Hinde, 1890, Suppl. Monogr. Cret. Entomostraca England and Ireland: Palaeontographical Soc., London, p. 44, pl. 3, figs. 48-54, pl. 4, fig. 39.

Cytherella obovata Jones and Hinde, 1890, Suppl. Monogr. Cret. Entomostraca England and Ireland: Palaeontographical Soc., London, p. 46, pl. 3, figs. 46, 47.

Cytherella navarroensis Alexander, 1929, Texas Univ. Bull. 2907, p. 53, pl. 2, figs. 1, 2.

Cytherella moremani Alexander, 1929, Texas Univ. Bull. 2907, p. 53, pl. 1, figs. 4, 5.
Jennings, 1936, Bull. Am. Paleontology, vol. 23, no. 78, p. 41, pl. 6. fig. 1.

Cytherella ovata (Roemer) Alexander, 1932, Amer. Mid. Naturalist, vol. 13, no. 5, p. 303, pl. 28, figs. 1, 2.
(non *C. ovata* Alexander, 1929, Texas Univ. Bull. 2907, p. 47, pl. 1, figs. 1, 2.)

Cytherella navarroensis Alexander. Swain, 1952, Ostracoda from wells in North Carolina, pt. 2, Mesozoic Ostracoda: U. S. Geol. Survey Prof. Paper 234-B, p. 68, pl. 8, fig. 1.

Cytherella ovata (Roemer) Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 7, pl. 1, fig. 12.

Range in North Carolina: Upper Cretaceous Peedee formation.
Occurrence: Rare
Figured specimen: Columbus County, well number 1, 110-120 feet, Peedee formation. Length 0.76 mm; height 0.49 mm; biconvexity 0.32 mm. U.S.N.M. 129705

Cytherella tubereulifera Alexander

Plate 1, Figure 2

Cytherella tubereulifera Alexander, 1929, Texas Univ. Bull. 2907, p. 55, pl. 2, fig. 3.
Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 7, pl. 1, figs. 3-5.

Range in North Carolina: Upper Cretaceous, Peedee and Black Creek formations.
Occurrence: Rare
Figured specimen: Onslow County, well number 6, 1093-1120 feet, Black Creek formation. Length 0.79 mm; height 0.43 mm. U.S.N.M. 129706

Cytherella herrieki Brown

Plate 1, Figure 4

Cytherella herricki Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 8, pl. 1, figs. 8-11.

Range in North Carolina: Upper Cretaceous, Peedee formation.
Occurrence: Rare to common
Figured specimen: Martin County, well number 1, 118-150 feet, Peedee formation. Length 0.82 mm; height 0.45 mm. U.S.N.M. 129707

Cytherella sp. *B.*

Plate 1, Figure 5

Range in North Carolina: upper (?) and middle Eocene, Castle Hayne limestone.
Occurrence: Common in upper (?) Eocene, rare in middle Eocene
Figured specimen: Craven County, well number 3, 111-125 feet, middle Eocene, lower part of Castle Hayne limestone. Length 0.63 mm; height 0.34 mm; biconvexity 0.22 mm. U.S.N.M. 129708

Genus Cytherelloidea Alexander, 1924

Cytherelloidea howei Swain

Plate 1, Figure 6

Cytherelloidea howei Swain, 1948, Maryland Dept. Geology, Mines and Water Res., Bull. 2, p. 190, pl. 12, fig. 5.
Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 15, pl. 1, figs. 2, 3.

Range in North Carolina: Paleocene and lower Eocene, unnamed units.
Occurrence: Very rare
Figured specimen: Craven County, well number 6, 50-60 feet, unnamed lower Eocene unit. Length 0.56 mm; height 0.30 mm. U.S.N.M. 129709

Cytherelloidea danvillensis Howe, var.

Plate 1, Figure 7

Cytherelloidea danvillensis Howe, 1934, Jour. Paleontology, v. 8, p. 31. Howe and Chambers, 1935, Louisiana Dept. Cons. Geol. Bull. 5, p. 6, pl. 5, fig. 5.
Berquist, 1942, Mississippi State Geol. Survey Bull. 49, Fossils, p. 104, pl. XI, fig. 2.

Range in North Carolina: upper (?) Eocene, upper part of Castle Hayne limestone.
Occurrence: Common
Figured specimen: Onslow County, well number 3, 79-83 feet, upper part of Castle Hayne limestone. Length 0.50 mm; height 0.27 mm. U.S.N.M. 129710

Cytherelloidea swaini Brown

Plate 1, Figure 8

Cytherelloidea swaini Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 8, pl. 1, figs. 16-19.

Range in North Carolina: Upper Cretaceous, Peedee formation.
Occurrence: Common
Figured specimen: Onslow County, well number 6, 740-750 feet. Peedee formation. Length 0.60 mm; height 0.35 mm. U.S.N.M. 129711

Cytherelloidea sohni Brown

Plate 1, Figure 9

Cytherelloidea sohni Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 9, pl. 2, figs. 1-3.

Range in North Carolina: Upper Cretaceous, Peedee formation.
Occurrence: Rare
Figured specimen: Gates County, well number 1, 485-615 feet, Peedee formation. Length 0.58 mm; height 0.32 mm. U.S.N.M. 129712

Cytherelloidea andrewsi Brown

Plate 1, Figure 10

Cytherelloidea andrewsi Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 9, pl. 1, figs. 24, 27, 28.

Range in North Carolina: Upper Cretaceous, Peedee formatioin.
Occurrence: Very rare
Figured specimen: Martin County, well number 2, 195-276 feet, Peedee formation. Length 0.49 mm; height 0.29 mm; biconvexity 0.17 mm. U.S.N.M. 129713

Cytherelloidea sp. *A*

Plate 1, Figure 11

Range in North Carolina: upper (?) and middle Eocene, Castle Hayne limestone.
Occurrence: Rare
Figured specimen: New Hanover County, well number 2, 55-65 feet, Castle Hayne limestone. Length 0.65 mm; height 0.32 mm. U.S.N.M. 129714

Cytherelloidea (?) *cuneiforma* Brown

Plate 1, Figure 3

Cytherelloidea cuneiforma Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 8, pl. 1, figs. 13-15.

Range in North Carolina: Upper Cretaceous, Peedee formation.
Occurrence: Very rare
Figured specimen: Columbus County, well number 1, 110-120 feet, Peedee formation. Length 0.68 mm; height 0.35 mm. U.S.N.M. 129715

Suborder Podocopa Sars, 1866
Family Cypridae Baird, 1845
Genus Paracypris Sars, 1866

Paracypris franquesi Howe and Chambers

Plate 1, Figure 12

Paracypris franquesi Howe and Chambers, 1935, Louisiana Dept. Cons. Geol. Bull. 5, p. 10, pl. 2, figs. 9, 13, pl. 4, figs, 15, 19.
Berquist, 1942, Mississippi State Geol. Survey Bull. 49; Fossils, p. 105, pl. XI, fig. 4.
Van den Bold, 1946, Contrib. to the study of Ostracoda, p. 66, pl. 1, fig. 16.
Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 16, pl. 1, fig. 6.

Range in North Carolina upper (?) and middle Eocene, Castle Hayne limestone.
Occurrence: Common in upper (?) Eocene, rare in middle Eocene
Figured specimen: Craven County, well number 3, 27-41 feet, Castle Hayne limestone. Length 0.87 mm; height 0.32 mm. U.S.N.M. 129716

Paracypris cf. *P. strceca* Schmidt

Plate 1, Figure 13

Paraeypris strecca Schmidt, 1948, Jour. Paleontology, v. 22, p. 408, pl. 63, figs. 21, 22.

Range in North Carolina: lower Eocene(?), unnamed unit.
Occurrence: Very rare
Figured specimen: Craven County, well number 6, 40-50 feet, unnamed lower Eocene(?) unit. Length 0.94 mm; height 0.34 mm. U.S.N.M. 129717

Family Bairdiidae Sars, 1888
Subfamily Bairdiinae Sars, 1923
Genus Bairdia McCoy, 1844

Bairdia sp. *A*

Plate 1, Figure 14

Range in North Carolina upper(?) Eocene, upper part of Castle Hayne limestone.
Occurrence: Common
Figured specimen: New Hanover County, well number 3, 25-45 feet, upper part of Castle Hayne limestone. Length 0.68 mm; height 0.36 mm. U.S.N.M. 129718

Bairdia sp. *B*

Plate 1, Figure 15

Range in North Carolina: upper(?) and middle Eocene, Castle Hayne limestone.
Occurrence: Common in upper(?) Eocene, rare in middle Eocene
Figured specimen: New Hanover County, well number 2, 55-65 feet, Castle Hayne limestone. Length 0.71 mm; height 0.58 mm. U.S.N.M. 129719

Genus Bairdoppilata Coryell, Sample and Jennings, 1935

Bairdoppilata pondera Jennings

Plate 1, Figure 16

Bairdoppilata pondera Jennings, 1936, Bull. Am. Paleontology, v. 23, no. 78, p. 45, pl. 6, fig. 9.
Schmidt, 1948, Jour. Paleontology, v. 22, p. 408, pl. 61, figs. 21, 22.
Swain, 1952, U. S. Geol. Survey Prof. Paper 234-B, p. 71, pl. 8, figs. 8-12.
Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 10, pl. 3, figs. 4, 7, 8.

Range in North Carolina: Upper Cretaceous, Peedee and Black Creek(?) formations.
Occurrence: Common
Figured specimen: Onslow County, well number 5, 342-370 feet, Peedee formation. Length 1.20 mm; height 0.68 mm. U.S.N.M. 129720

Family Cytheridae Baird, 1850
Subfamily Cytherideinae Sars, 1925
Genus Cytheridea Bosquet, 1852
Subgenus Haplocytheridea Stephenson, 1936

Cytheridea (Haploeytheridea) montgomeryensis Howe and Chambers

Plate 5, Figure 4

Cytheridea montgomeryensis Howe and Chambers, 1935, Louisiana Dept. Cons. Geol. Bull. 5, p. 17, pl. 1, fig. 1, pl. 2, figs. 1-3, pl. 6, figs. 17-18.
Cytheridea (Haploeytheridea) montgomeryensis Howe and Chambers, Stephenson, 1936, Jour. Paleontology, v. 10, p. 700, pl. 94, figs. 3, 4, 9, text figs. lg, h, j, k.
Stephenson, 1937, Jour. Paleontology, v. 16, p. 109, pl. 18, figs. 17-18.
Cytheridea montgomeryensis Howe and Chambers, Berquist, 1942, Mississippi Geol. Survey Bull. 49, p. 106, pl. 11, fig. 5.
Haploeytheridea montgomeryensis (Howe and Chambers) Stephenson, 1946, Jour. Paleontology, v. 20, p. 322, pl. 42, fig. 29.
Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 20, pl. 1, fig. 18, pl. 2, figs. 1-4.

Range in North Carolina: upper(?) and middle Eocene, Castle Hayne limestone
Occurrence: Abundant in upper (?) Eocene, common in middle Eocene.
Figured specimen: Beaufort County, well number 4, 127-147 feet, Castle Hayne limestone. Length 0.62 mm; height 0.29 mm; biconvexity 0.22 mm. U.S.N.M. 129721

Cytheridea (Haploeytheridea) ruginosa Alexander

Plate 5, Figure 5

Cytheridea ruginosa Alexander, 1934, Jour. Paleontology, v. 8, p. 224, pl. 33, fig. 9.
Harris and Jobe, 1951, Microfauna Midway Ark., p. 73, pl. 14, fig. 2.

Range in North Carolina: Paleocene, unnamed unit.
Occurrence: Rare in Paleocene.
Figured specimen: Beaufort County, well number 1, 190-210 feet, unnamed Paleocene unit. Length 0.84 mm; height 0.44 mm; convexity 0.17 mm. U.S.N.M. 129722

Cytheridea (Haplocytheridea) fabaformis (Berry)

Plate 5, Figure 7

Cytherella fabaformis Berry, 1925, Am. Jour. Sci., 5th. serv., v. 9, p. 487, fig. 13.
Cytheridea fabaformis (Berry) Alexander, 1929, Texas Univ. Bull. 2907, p. 76, pl. 5, fig. 18.
Alexander, 1934, Jour. Paleontology, v. 8, p. 224.
Haplocytheridea ? fabaformis (Berry) Schmidt, 1948, Jour. Paleontology, v. 22, p. 426, pl. 62, fig. 23, text fig. 2e.
Cytheridea (Haplocytheridea) fabaformis (Berry), Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 17, pl. 2, figs. 7, 8.
Range in North Carolina: Upper Cretaceous, Peedee formation.
Occurrence: Abundant
Figured specimen: New Hanover County, well number 5, 165-169 feet, Peedee formation. Length 0.51 mm; height 0.29 mm; biconvexity 0.24 mm, female. U.S.N.M. 129723

Cytheridea (Haplocytheridea) ulrichi (Berry)

Plate 5, Figure 6

Cythere ulrichi Berry, 1925, Am. Jour. Sci., 5th ser., v. 23, no. 9, p. 483, fig. 3.
Haplocytheridea ? ulrichi (Berry), Schmidt, 1948, Jour. Paleontology, v. 22, p. 426, pl. 62, figs. 18, 19.
Cytheridea (Haplocytheridea) ulrichi (Berry), Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 18, pl. 2, figs. 4, 5.
Range in North Carolina: Upper Cretaceous, Peedee formation.
Occurrence: Abundant
Figured specimen: Beaufort County, well number 2, 185-195 feet, Peedee formation. Length 0.64 mm; height 0.36 mm. U.S.N.M. 129724

Cytheridea (Haplocytheridea) monmouthensis Berry

Plate 5, Figure 8

Cytheridea monmouthensis Berry, 1925, Am. Jour. Sci., 5th ser., v. 9, p. 486, fig. 10.
Alexander, 1929, Texas Univ. Bull. 2907, p. 74, pl. 5, figs. 11-14.
Cytheridea (Haplocytheridea) monmouthensis Berry, Swain, 1948, Maryland Dept. Geol. Mines, and Water Res. Bull. 2, p. 212, pl. 14, fig. 14.
Haplocytheridea monmouthensis (Berry), Swain, 1952, U. S. Geol. Survey Prof. Paper 234-B, p. 79, pl. 8, fig. 19.
Cytheridea (Haplocytheridea) monmouthensis Berry, Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 19, pl. 2, fig. 6.
Range in North Carolina: Upper Cretaceous, Peedee and Black Creek formations
Occurrence: Rare in Peedee, common in Black Creek
Figured specimen: Pitt County, well number 2, 119-132 feet, Black Creek formation. Length 0.81 mm; height 0.43 mm; biconvexity 0.35 mm, male. U.S.N.M. 129725

Cytheridea (Haplocytheridea) carolinensis Brown

Plate 5, Figure 9

Cytheridea (Haplocytheridea) carolinensis Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 19, pl. 2, figs. 17-20.
Range in North Carolina: Upper Cretaceous, Peedee formation.
Occurrence: Rare
Figured specimen: Lenoir County, well number 3, 68-84 feet, Peedee formation. Length 0.54 mm; height 0.30 mm; biconvexity 0.19 mm, female. U.S.N.M. 129726

Cytheridea (Haplocytheridea) councilli Brown

Plate 5, Figure 10

Cytheridea (Haplocytheridea) councilli Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 17, pl. 2, figs. 12-16.
Range in North Carolina: Upper Cretaceous, Peedee formation.
Occurrence: Common
Figured specimen: New Hanover County, well number 1, 238-248 feet, Peedee formation. Length 0.51 mm; height 0.27 mm; biconvexity 0.23 mm, female. U.S.N.M. 129727

Cytheridea (Haplocytheridea) punctura (Schmidt)

Plate 5, Figure 11

Haplocytheridea punctura Schmidt, 1948, Jour. Paleontology, v. 22, p. 425, pl. 61, figs. 27-31.
Cytheridea (Haplocytheridea) punctura (Schmidt), Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 19, pl. 2, figs. 26-28.
Range in North Carolina: Upper Cretaceous, Peedee formation.
Occurrence: Rare
Figured specimen: Lenoir County, well number 3, 68-84 feet, Peedee formation. Length 0.69 mm; height 0.47 mm; convexity 0.19 mm, female. U.S.N.M. 129728

Cytheridea (Haplocytheridea) hopkinsi Howe and Garrett

Plate 5, Figure 12

Cytheridea hopkinsi Howe and Garrett, 1934, Louisiana Dept. Cons., Geol. Bull. 4, p. 31, pl. 1, figs. 16-18.
? *Cytheridea (Leptocytheridea) hopkinsi* Howe and Garrett, Stephenson, 1938, Jour. Paleontology, v. 12, p. 583, pl. 67, figs. 13, 14, text figs. 8, 11, 12.
? *Cytheridea (Haploeytheridea ?)* sp., Stephenson, 1942, Jour. Paleontology, v. 16, p. 110, pl. 18, figs. 7, 8.
Haplocytheridea ? cf. H ? hopkinsi (Howe and Garrett) Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 23, pl. 2, fig. 5.
Range in North Carolina: lower Eocene and Paleocene, unnamed units.
Occurrence: Very rare
Figured specimen: Chowan County, well number 1, 360-370 feet, unnamed Paleocene unit. Length 0.60 mm; height 0.39 mm; biconvexity 0.35 mm. U.S.N.M. 129729

Cytheridea (Haplocytheridea) moodyi Howe and Garrett

Plate 5, Figure 13

Cytheridea moodyi Howe and Garrett, 1934, Louisiana Dept. Cons, Geol. Bull. 4, p. 35, pl. 2, figs. 2-6.
Cytheridea (Haplocytheridea) moodyi Howe and Garrett, Stephenson, 1938, Jour. Paleontology, v. 12, p. 573, pl. 67, fig. 3, text figs. 3, 4.
Cytheridea (Haplocytheridea) subovata Sutton and Williams, 1939, Jour. Paleontology, v. 13, p. 569, pl. 64, figs. 26-28.
Cytheridea (Haploeytheridea) bastropensis Sutton and Williams, 1940, Jour. Paleontology, v. 14, p. 163.
Haplocytheridea moodyi (Howe and Garrett) Stephenson, 1946, Jour. Paleontology, v. 20, p. 323, pl. 42, fig. 25, pl. 44, fig. 15.
Range in North Carolina: lower Eocene(?) and Paleocene, unnamed units.
Occurrence: Very rare
Figured specimen: Chowan County, well number 1, 380-400-feet, unnamed Paleocene unit. Length 0.71 mm; height 0.38 mm; biconvexity 0.28 mm, female. U.S.N.M. 129730

Cytheridea (Haplocytheridea) proboscidiala Edwards

Plate 5, Figure 14

Cytheridea (Haplocytheridea) proboscidiala Edwards, 1944, Jour. Paleontology, v. 18, p. 508, pl. 85, figs. 8-11.
Range in North Carolina: upper Miocene, Yorktown formation.
Occurrence: Very rare
Figured specimen: Beaufort County, well number 8, 95-105 feet, Yorktown formation. Length 0.53 mm; height 0.24 mm. U.S.N.M. 129731

Subgenus Clithrocytheridea Stephenson, 1936

Cytheridea (Clithrocytheridea) virginica (Schmidt)

Plate 5, Figure 15

Clithrocytheridea virginica Schmidt, 1948, Jour. Paleontology, v. 22, p. 429, pl. 64, figs. 21-23.
Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 24, pl. 2, figs. 21-23.
Range in North Carolina: middle Eocene, lower part of Castle Hayne limestone, and lower Eocene and Paleocene, unnamed units.
Occurrence: Abundant in middle Eocene, rare in lower Eocene, common in Paleocene.
Figured specimen: Beaufort County, well number 7, 170-186 feet, lower part of Castle Hayne limestone. Length 0.67 mm; height 0.31 mm. U.S.N.M. 129732

Cytheridea (Clithrocytheridea) caldwellensis Howe and Chambers

Plate 5, Figure 16

Cytheridea ? caldwellensis Howe and Chambers, 1935, Louisiana Dept. Cons. Geol. Bull. 5, p. 11, pl. 1, fig. 7, pl. 2, figs. 4-6.

Cytheridea (Clithroeytheridea) caldwellensis Howe and Chambers, Stephenson, 1937, Jour. Paleontology, v. 11, p. 14, pl. 26, fig. 13.

Clithrocytheridea caldwellensis (Howe and Chambers) Stephenson, 1946, Jour. Paleontology, v. 20, p. 327, pl. 42, fig. 13.

Clithroeytheridea cf. *C. caldwellensis* (Howe and Chambers) Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 24, pl. 2, fig. 28.

Range in North Carolina: upper(?) and middle Eocene, Castle Hayne limestone.

Occurrence: Common

Figured specimen: Jones County, well number 1, 45-53 feet, upper part of Castle Hayne limestone. Length 0.63 mm; height 0.30 mm; biconvexity 0.26 mm. U.S.N.M. 129733

Genus Paracytheridea Muller, 1894

Paraeytheridea vandenboldi Puri

Plate 8, Figure 6

Cytheropteron modosum Ulrich and Bassler, 1904, Maryland Geol. Survey, Miocene vol., p. 129, pl. 38, figs. 37-40.
(not *C. nodosum* Brady, 1868)

Paraeytheridea nodosa (Ulrich and Bassler) Howe and others, 1935, Florida Dept. Cons. Geol. Bull. 13, p. 37, pl. 3, fig. 7.

? *Paraeytheridea altila* Edwards, 1944, Jour. Paleontology, v. 18, p. 512, pl. 85, figs. 20, 21.

Paraeytheridea nodosa (Ulrich and Bassler), Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 51, pl. 3, figs. 19-22.

Paraeytheridea vandenboldi Puri, 1953, Jour. Paleontology, v. 27, p. 751. Malkin, 1953, Jour. Paleontology, v. 27, p. 780, pl. 79, fig. 5.

Puri, 1953, Florida Geol. Survey Bull. 36, p. 238, pl. 3, fig. 7, text figs. 5a, b.

Swain, 1955, Jour. Paleontology, v. 29, p. 625, pl. 62, figs. 2a, b.

Range in North Carolina: upper Miocene, Yorktown formation.

Occurrence: Common

Figured specimen: Carteret County, well number 2, 120-150 feet, Yorktown formation. Length 0.67 mm; height 0. 31 mm. U.S.N.M. 129734

Paracytheridea belhavenensis Howe and Chambers

Plate 8, Figure 7

Paracytheridea belhavenensis Howe and Chambers, 1935, Louisiana Dept. Cons. Geol. Bull. 5, p. 18, pl. 5, fig. 9.

Blake, 1950, Jour. Paleontology, v. 24, p. 176, pl. 29, figs. 3, 4.

Range in North Carolina: upper(?) Eocene, upper part of Castle Hayne limestone.

Occurrence: Rare.

Figured specimen: Craven County, well number 3, 27-41 feet, upper part of Castle Hayne limestone. Length 0.63 mm; height 0.35 mm. U.S.N.M. 129735.

Paracytheridea (?) *cf. P.* (?) *wetherellii* (Jones)

Plate 8, Figure 8

Cythere wetherellii Jones, 1854, Quarterly Jour. Geol. Society, London, v. 10, p. 161, pl. 3, fig. 9.

Jones, 1856, Tertiary Entomo. England, p. 27, pl. 4, fig. 15, pl. 6, figs. 16 a-d.

Paracytheridea ? *wetherellii* (Jones) Swain, 1951, U. S. Geol. Survey, Prof. Paper 234-A, p. 51, pl. 7, figs. 2-4.

Range in North Carolina: post-Miocene, and Miocene Yorktown formation.

Occurrence: Common.

Figured specimen: Washington County, well number 2, 65-80 feet, Yorktown formation. Length 0.54 mm; height 0.35 m. U.S.N.M. 129736.

Subfamily Cytherurinae Muller, 1894
Genus Cytherura Sars, 1866

Cytherura sp. aff. *C. washburni* Stephenson

Plate 7, Figure 3

Cytherura washburni Stephenson, 1946, Jour. Paleontology, v. 20, p. 317, pl. 43, fig. 5.

Cytherura sp. aff. *C. washburni* Stephenson, Swain, 1951, U. S. Geol. Survey, Prof. Paper 234-A, p. 50, pl. 7, fig. 27.

Range in North Carolina: middle Eocene, lower part of Castle Hayne limestone.

Occurrence: Common.

Figured specimen: Washington County, well number 1, 240-250 feet, lower part of Castle Hayne limestone. Length 0.45 mm; height 0.18 mm. U.S.N.M. 129737.

Cytherura glossensis Brown

Plate 7, Figure 4

Cytherura glossensis Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 25, pl. 6, figs. 18, 19.

Range in North Carolina: Upper Cretaceous, Peedee and Black Creek formations.

Occurrence: Rare.

Figured specimen: Brunswick County, well number 1, 188-198 feet. Peedee formation. Length 0.34 mm; height 0.17 mm. U.S.N.M. 129738.

Cytherura elongata Edwards

Plate 7, Figure 5

Cytherura elongata Edwards, 1944, Jour. Paleontology, v. 18, p. 527, pl. 88, figs. 21-25.

Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 50, pl. 7, figs. 24, 25.

Swain, 1955, Jour. Paleontology, v. 29, p. 628, pl. 64, figs. 12a-b.

Range in North Carolina: upper Miocene, Yorktown formation.

Occurrence: Common.

Figured specimen: Beaufort County, well number 7, 70-80 feet, Yorktown formation. Length 0.35 mm; height 0.16 mm. U.S.N.M. 129739.

Cytherura sp. aff. *C. oxyeruris* Munsey

Plate 7, Figure 6

Cytherura oxyeruris Munsey, 1953, Jour. Paleontology, v. 27, p. 18, pl. 1, figs. 22, 23.

Range in North Carolina: Paleocene, unnamed unit.

Occurrence: Very rare.

Figured specimen: Chowan County, well number 1, 360-370 feet, unnamed Paleocene unit. Length 0.45 mm; height 0.20 mm; biconvexity 0.22 mm. U.S.N.M. 129740.

Cytherura sp. *B.*

Plate 7, Figure 7

Range in North Carolina: upper and middle Eocene(?), Castle Hayne limestone.

Occurrence: Rare.

Figured specimen: Onslow County, well number 3, 73-79 feet, upper part of Castle Hayne limestone. Length 0.39 mm; height 0.21 mm. U.S.N.M. 129741.

Genus Eucytherura Muller, 1894

Eucytherura curta (Jennings)

Plate 1, Figure 18

Cythereis curta Jennings, 1936, Bull. Am. Paleontology, v. 23, no. 78, p. 52, pl. 7, figs. 4a-b.

Eucytherura curta (Jennings) Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 25, pl. 6, figs. 20, 21.

Range in North Carolina: Upper Cretaceous, Peedee formation.

Occurrence: Abundant.

Figured specimen: New Hanover County, well number 4, 400-490 feet, Peedee formation. Length 0.52 mm; height 0.27 mm; biconvexity 0.22 mm. U.S.N.M. 129742.

Genus Cytheropteron Sars, 1866
Subgenus Cytheropteron Sars, s.s.

Cytheropteron cf. *C. subretieulatum* van den Bold

Plate 7, Figure 10

Cytheropteron subretieulatum van den Bold, 1946, Contrib. to the Study of the Ostracoda, p. 113, pl. 14, fig. 6.

Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 48, pl. 7, figs. 11, 13.

Range in North Carolina: upper Miocene, Yorktown formation.

Occurrence: Very rare.

Figured specimen: Washington County, well number 2, 80-95 feet, Yorktown formation. Length 0.52 mm; height 0.29 mm; biconvexity 0.33 mm. U.S.N.M. 129743.

Cytheropteron (Cytheropteron) sp. *A*

Plate 7, Figure 11

Range in North Carolina: upper(?) Eocene, upper part of Castle Hayne limestone.

Occurrence: Common.

Figured specimen: Jones County, well number 1, 45-53 feet, upper part of Castle Hayne limestone. Length 0.36 mm; height 0.23 mm; biconvexity 0.24 mm. U.S.N.M. 129744.

Cytheropteron (Cytheropteron) penderensis Brown

Plate 7, Figure 12

Cytheropteron (Cytheropteron) penderensis Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 20, pl. 6, figs. 12, 13.

Range in North Carolina: Upper Cretaceous, Peedee formation.

Occurrence: Rare.

Figured specimen: New Hanover County, well number 1, 310-343 feet, Peedee formation. Length 0.52 mm; height 0.24 mm. U.S.N.M. 129745.

Subgenus Eocytheropteron Alexander, 1933

Cytheropteron (Eoeytheropteron) striatum Brown

Plate 7, Figure 13

Cytheropteron (Eocytheropteron) striatum Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 20, pl. 6, figs. 16, 17.

Range in North Carolina: Upper Cretaceous, Black Creek formation.

Occurrence: Rare.

Figured specimen: Green County, well number 1, 91-101 feet, Black Creek formation. Length 0.55 mm; height 0.29 mm. U.S.N.M. 129746.

Cytheropteron (Eocytheropteron) straillis Brown

Plate 7, Figure 14

Cytheropteron (Eocytheropteron) straillis Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 20, pl. 6, figs. 14, 15.

Range in North Carolina: Upper Cretaceous, Peedee formation.

Occurrence: Common.

Figured specimen: New Hanover County, well number 4, 40-50 feet, Peedee formation. Length 0.70 mm; height 0.46 mm. U.S.N.M. 129747.

Subfamily Brachycytherinae Puri, 1953
Genus Brachcythere Alexander, 1933

Brachycythere watervalleyensis Howe and Chambers

Plate 2, Figure 1

Brachycythere watervalleyensis Howe and Chambers, 1935, Louisiana Dept. Cons. Geol. Bull. 5, p. 46, pl. 3, figs. 1, 2, 3, 5, 6, pl. 4, fig. 1, pl. 6, fig. 7.

Murray and Hussey, 1942, Jour. Paleontology, v. 16, p. 179, pl. 28, figs. 2, 3; text fig. 2; figs. 5, 6.

Berquist, 1942, Mississippi State Geol. Survey Bull. 49, p. 109, pl. 11, figs. 21, 22.

Range in North Carolina: upper(?) and middle Eocene, Castle Hayne limestone.

Occurrence: Common in upper(?) Eocene, very rare in middle Eocene.

Figured specimen: Onslow County, well number 4, 140-150 feet, Castle Hayne limestone. Length 0.87 mm; height 0.44 mm; biconvexity 0.51 mm. U.S.N.M. 129748.

Brachycythere martini Murray and Hussey

Plate 2, Figure 2

Brachycythere martini Murray and Hussey, 1942, Jour. Paleontology, v. 16, p. 177, pl. 28, figs. 6, 10, text fig. 2; figs. 4, 8, 9, 10.

Stephenson, 1946, Jour. Paleontology, v. 20, p. 333, pl. 44, fig. 21, pl. 45, fig. 24.

Blake, 1950, Jour. Paleontology, v. 24, p. 177, pl. 30, figs. 28, 29.

Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 44, pl. 6, fig. 26.

Range in North Carolina: middle Eocene, lower part of Castle Hayne limestone.

Occurrence: Very rare.

Figured specimen: Onslow County, well number 3, 199-225 feet, Castle Hayne limestone. Length 1.18 mm; height 0.61 mm. U.S.N.M. 129749.

Brachycythere bernardi Murray and Hussey

Plate 2, Figure 3

Brachycythere bernardi Murray and Hussey, 1942, Jour. Paleontology, v. 16, p. 176, pl. 28, figs. 7, 9, text. fig. 2; figs. 14-16.

Range in North Carolina: middle Eocene, lower part of Castle Hayne limestone.

Occurrence: Rare.

Figured specimen: Craven County, well number 7, 67-100 feet, lower part of Castle Hayne limestone. Length 0.80 mm; height 0.37 mm; biconvexity 0.51 mm. U.S.N.M. 129750.

Brachycythere jessupensis Howe and Garrett

Plate 2, Figure 4

Brachycythere jessupensis Howe and Garrett, 1934, Louisiana Dept. Cons. Geol. Bull. 4, p. 47, pl. 3, figs. 14, 16, 17.

Murray and Hussey, 1942, Jour. Paleontology, v. 16, p. 180, pl. 28, figs. 13, 14, text fig. 2; fig. 20.

Brachycythere cf. B. jessupensis Howe and Garrett, Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 45, pl. 7, fig. 10.

Range in North Carolina: lower Eocene and Paleocene, unnamed units.

Occurrence: Rare.

Figured specimen: Craven County, well number 6, 50-60 feet, unnamed lower Eocene unit. Length 0.87 mm; height 0.53 mm; biconvexity 0.49 mm. U.S.N.M. 129751.

Brachycythere marylandica (Ulrich)

Plate 2, Figure 5

Cythere marylandica Ulrich, 1901, Maryland Geol. Survey; Eocene, p. 119, pl. 16, figs. 16-18.

Brachycythere nanafaliana Howe and Pyeatt, Howe and Garrett, 1934, Louisiana Dept. Cons. Geol. Bull. 4, p. 48, pl. 3, fig. 18, pl. 4, figs. 1-3.

Murray and Hussey, 1942, Jour. Paleontology, v. 16, p. 180, pl. 28, figs. 11, 12, text fig. 2.

Brachycythere marylandica (Ulrich) Schmidt, 1948, Jour. Paleontology, v. 22, p. 416, pl. 63, figs. 17-20.

(non Murray and Hussey, 1942, Jour. Paleontology, v. 16, p. 174, pl. 27, figs. 7, 8, text fig. 2, figs. 11, 12, 13.)

Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 44, pl. 7, fig. 1.

Range in North Carolina: Paleocene and lower Eocene, unnamed unit.

Occurrence: Common.

Figured specimen: Craven County, well number 6, 40-50 feet, unnamed lower Eocene unit. Length 1.17 mm; height 0.59 mm; biconvexity 0.66 mm. U.S.N.M. 129752.

Brachycythere interrasilis Alexander

Plate 2, Figure 6

Brachycythere interrasilis Alexander, 1934, Jour. Paleontology, v. 8, p. 217, pl. 33, fig. 4.

Kline, 1943, Mississippi State Geol. Survey Bull. 53, p. 47, pl. 8, fig. 5.

Harris and Jobe, 1951, Microfauna Midway Ark., p. 70, pl. 12, fig. 4.

Brachycythere marylandica (Ulrich) Murray and Hussey, 1942, Jour. Paleontology, v. 16, p. 174, pl. 27, figs. 7, 8; text fig. 2, figs. 11, 12, 13.

Range in North Carolina: Paleocene, unnamed unit.

Occurrence: Common.

Figured specimen: Beaufort County, well number 1, 190-210 feet, unnamed Paleocene unit. Length 1.03 mm; height 0.57 mm; biconvexity 0.59 mm. U.S.N.M. 129753.

Brachycythere cf. *B. verrucosa* Harris and Jobe

Plate 2, Figure 7

Brachycythere verrucosa Harris and Jobe, 1951, Microfauna Midway Ark., p. 71, pl. 12, fig. 3.

Range in North Carolina: Paleocene, unnamed unit.

Occurrence: Rare.

Figured specimen: Martin County, well number 1, 48-95 feet, unnamed Paleocene unit. Length 1.14 mm; height 0.49 mm; biconvexity 0.68 mm. U.S.N.M. 129754.

Brachycythere formosa Alexander

Plate 2, Figure 8

Brachycythere formosa Alexander, 1934, Jour. Paleontology, v. 8, p. 217, pl. 33, fig. 3.
Murray and Hussey, 1942, Jour. Paleontology, v. 16, p. 175, pl. 27, figs. 1, 4, text fig. 2; figs. 17, 18, 21, 22.
Kline, 1943, Mississippi State Geol. Survey Bull. 53, p. 66, pl. 8, fig. 7.
Harris and Jobe, 1951, Microfauna Midway Ark., p. 70, pl. 12, fig. 5.

Range in North Carolina: Paleocene, unnamed unit.
Occurrence: Very rare.
Figured specimen: Chowan County, well number 1, 340-360 feet, unnamed Paleocene unit. Length 0.61 mm; height 0.41 mm. U.S.N.M. 129755.

Brachycythere rhomboidalis (Berry)

Plate 2, Figure 9

Cythere rhomboidalis Berry, 1925, Am. Jour. Sci., 5th ser., v. 9, p. 481, figs. 1, 2.
Alexander, 1929, Texas Univ. Bull. 2907, p. 86, pl. 7, figs. 1, 2.
Brachycythere rhomboidalis (Berry) Alexander, 1933, Jour. Paleontology, v. 7, p. 206.
Brachycythere jerseyensis Jennings, 1936, Bull. Am. Paleontology, v. 23, no. 78, p. 48, pl. 6, figs. 14a-b.
Brachycythere rhomboidalis (Berry) Schmidt, 1948, Jour. Paleontology, v. 22, p. 414, pl. 62, figs. 8-10.
Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 11, pl. 4, figs. 5, 8, 9, 10.

Range in North Carolina: Upper Cretaceous, Peedee formation.
Occurrence: Abundant.
Figured specimen: Martin County, well number 2, 195-276 feet, Peedee formation. Length 0.94 mm; height 0.52 mm. U.S.N.M. 129756.

Brachycythere nausiformis Swain

Plate 2, Figure 10

Brachycythere nausiformis Swain, 1952, U. S. Geol. Survey Prof. Paper 234-B, p. 80, pl. 8, figs. 44-47.
Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 12, pl. 4, figs. 3, 4.

Range in North Carolina: Upper Cretaceous, Black Creek formation.
Occurrence: Common.
Figured specimen: New Hanover County, well number 4, 840-900 feet, Black Creek formation. Length 0.95 mm; height 0.45 mm. U.S.N.M. 129757.

Brachycythere sphenoides (Reuss)

Plate 2, Figure 11

Cythere sphenoides Reuss, 1854, Denkschr. K. Akad. Wissen. Wien., v. 7, p. 141, pl. 26, fig. 2.
Alexander, 1929, Texas Univ. Bull. 2907, p. 81, pl. 7, figs. 9, 14.
Cytheropteron sphenoides (Reuss), Jones and Hinde, 1889, Supp. Mon. Cret. Entom., England, Ireland, Palaeontological Soc. London, p. 33, pl. 1, figs. 18-20.
Cytheropteron sp. *B.*, Israelsky, 1929, Arkansas Geol. Survey Bull. 2, app; p. 8, pl. 1A, figs. 2a-c.
Brachycythere sphenoides (Reuss), Alexander, 1933, Jour. Paleontology, v. 7, p. 205, pl. 25, figs. 3a-3c, 14a, b, pl. 26, figs. 7a, b, pl. 27, fig. 19.
Swain, 1952, U. S. Geol. Survey Prof. Paper 234-B, p. 80, pl. 8, figs. 42, 43.
Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 11, pl. 4, fig. 16.

Range in North Carolina: Upper Cretaceous, Black Creek formation.
Occurrence: Abundant.
Figured specimen: New Hanover County, well number 4, 840-900 feet, Black Creek formation. Length 0.78 mm; height 0.48 mm; biconvexity 0.39 mm. U.S.N.M. 129758.

Brachycythere ledaforma (Israelsky)

Plate 2, Figure 12

Cytheropteron ledaforma Israelsky, 1929, Arkansas Geol. Survey Bull. 2, app., p. 8, pl. 1A, figs. 5-7.
Cythere acutocaudata Alexander, 1929, Texas Univ. Bull. 2907, p. 87, pl. 7, figs. 5, 6.
Brachycythere ledaforma (Israelsky) Alexander, 1933, Jour. Paleontology, v. 7, p. 206, pl. 25, fig. 9, pl. 27, fig. 20.
Jennings, 1936, Bull. Am. Paleontology, v. 23, no. 78, p. 49, pl. 6, fig. 15.
Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 12, pl. 4, fig. 6.

Range in North Carolina: Upper Cretaceous, Black Creek formation.
Occurrence: Abundant.
Figured specimen: Greene County, well number 1, 91-101 feet, Black Creek formation. Length 0.63 mm; height 0.35 mm; biconvexity 0.36 mm. U.S.N.M. 129759.

Brachycythere raleighensis Brown

Plate 2, Figure 13

Brachycythere raleighensis Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 13, pl. 4, figs. 11-13.

Range in North Carolina: Upper Cretaceous, Peedee and Black Creek formations.
Occurrence: Rare in Peedee formation, very rare in Black Creek formation.
Figured specimen: Lenoir County, well number 3, 128-143 feet, Peedee formation. Length 0.64 mm; height 0.34 mm; biconvexity 0.38 mm. U.S.N.M. 129760.

Brachycythere plena Alexander

Plate 2, Figure 14

Brachycythere plena Alexander, 1934, Jour. Paleontology, v. 8, p. 216, pl. 33, fig. 6.
Murray and Hussey, 1942, Jour. Paleontology, v. 16, p. 176, pl. 27, figs. 2, 5, 6. Text fig. 2; figs. 3, 7.
Kline, 1943, Mississippi Geol. Survey Bull. 53, p. 67, pl. 8, fig. 3.
Van den Bold, 1946, Cont. Study Ostracoda, p. 108, pl. 13, figs. 4, 5.
Harris and Jobe, 1951, Microfauna Midway Arkansas, p. 71, pl. 12, fig. 6.
Munsey, 1953, Jour. Paleontology, v. 27, p. 11, pl. 3, figs. 17-21.
Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 12, pl. 4, fig. 7.

Range in North Carolina: Paleocene, unnamed unit, and Upper Cretaceous, Peedee formation.
Occurrence: Very rare in Paleocene sediments, rare in Peedee formation.
Figured specimen: Bertie County, well number 1, 70-83 feet, unnamed Paleocene unit. Length 1.08 mm; height 0.53 mm; convexity 0.33 mm. U.S.N.M. 129761.

Genus Alatacythere Murray and Hussey, 1942

Alatacythere alata atlantica (Schmidt)

Plate 8, Figure 1

Brachycythere alata atlantica Schmidt, 1948, Jour. Paleontology, v. 22, p. 415, pl. 61, figs. 23, 24.
Alatacythere alata atlantica (Schmidt) Brown, 1957, N. C. Dept. Cons, and Devel. Bull. 70, p. 13, pl. 4, figs. 1, 2.

Range in North Carolina: Upper Cretaceous, Peedee formation.
Occurrence: Common.
Figured specimen: Onslow County, well number 3, 307-319 feet, Peedee formation. Length 1.10 mm; height 0.54 mm. U.S.N.M. 129762.

Alatacythere lemnicata (Alexander)

Plate 8, Figure 2

Cythereis (Pterygocythereis) lemnicata Alexander, 1934, Jour. Paleontology, v. 8, p. 217, pl. 33, fig. 3, pl. 35, figs. 10, 11.
Alatacythere lemnicata (Alexander) Murray and Hussey, 1942, Jour. Paleontology, v. 16, p. 173, pl. 27, figs. 9, 12.
Harris and Jobe, 1951, Microfauna Midway Ark., p. 70, pl. 13, figs. 1a, b.

Range in North Carolina: lower Eocene(?) and Paleocene, unnamed units.
Occurrence: Very rare.
Figured specimen: Martin County, well number 1, 48-95 feet, unnamed Paleocene unit. Length 1.21 mm; height 0.59 mm. U.S.N.M. 129763.

Alatacythere sp. aff. *A. gulfensis* (Alexander)

Plate 8, Figure 3

Cythere cornuta Roemer, var. *gulfensis*, Alexander, 1929, Texas Univ. Bull, 2907, p. 85, pl. 8, figs. 1, 2, 6.

Range in North Carolina: Upper Cretaceous, Black Creek formation.
Occurrence: Very rare.
Figured specimen: Greene County, well number 1, 87-91 feet, Black Creek formation. Length 0.84 mm; height 0.31 mm. U.S.N.M. 129764.

Alatacythere ivani Howe

Plate 8, Figure 4

Cythereis (Pterygocythereis) alexanderi Howe and Law, 1936 Louisiana Dept. Cons. Geol. Bull. 4, p. 42, pl. 4, fig. 23, pl. 5, fig. 5.

Alatacythere alexanderi (Howe and Law) Murray and Hussey, 1942, Jour. Paleontology, v. 16, p. 171, pl. 27, figs. 10, 11; text fig. 1; figs. 2, 10.

Alatacythere ivani Howe, 1951, Jour. Paleontology, p. 538.

Range in North Carolina: Upper(?) and middle Eocene, Castle Hayne limestone, and lower Eocene and Paleocene(?), unnamed units.

Occurrence: Very rare.

Figured specimen: Craven County, well number 5, 30-40 feet, Castle Hayne limestone. Length 1.03 mm; height 0.54 mm. U.S.N.M. 129765.

Subfamily Trachyleberinae Sylvester-Bradley, 1948
Genus Trachyleberis Brady, 1898

Trachyleberis rukasi (Gooch)

Plate 3, Figure 11

Cythereis rukasi Gooch, 1939, Jour. Paleontology, v. 13, p. 586, pl. 67, figs. 20-22.

Trachyleberis (?) *rukasi* (Gooch), Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 30, pl. 4, figs. 8-10.

Range in North Carolina: middle Eocene, lower part of Castle Hayne limestone.

Occurrence: Abundant.

Figured specimen: Beaufort County, well number 4, 80-110 feet, lower part of Castle Hayne limestone. Length 0.51 mm; height 0.34 mm. U.S.N.M. 129766.

Trachyleberis sp. *A*

Plate 3, Figure 5

Range in North Carolina: upper Eocene(?), upper part of Castle Hayne limestone.

Occurrence: Common.

Figured specimen: Pender County, well number 1, 47-70 feet, upper part of Castle Hayne limestone. Length 0.63 mm; height 0.73 mm. U.S.N.M. 129767.

Trachyleberis sp. *B*

Plate 3, Figure 6

Range in North Carolina: upper(?) Eocene, upper part of Castle Hayne limestone.

Occurrence: Abundant.

Figured specimen: Pender County, well number 1, 70-73 feet, upper part of Castle Hayne limestone. Length 0.68 mm; height 0.33 mm; biconvexity 0.28 mm. U.S.N.M. 129768.

Trachyleberis sp. *C*

Plate 3, Figure 7

Range in North Carolina: upper(?) Eocene, upper part of Castle Hayne limestone.

Occurrence: Common.

Figured specimen: Brunswick County, well number 1, 59-62 feet, upper part of Castle Hayne limestone. Length 0.56 mm; height 0.27 mm. U.S.N.M. 129769.

Trachyleberis montgomeryensis (Howe and Chambers)

Plate 3, Figure 8

Cythereis montgomeryensis Howe and Chambers, 1935, Louisiana Dept. Cons. Geol. Bull. 5, p. 37, pl. 1, figs. 13, 16, pl. 2, figs. 22, 23, pl. 4, figs. 19, 20.

Berquist, 1942, Mississippi State Geol. Survey Bull. 49, Fossils; p. 108, pl. 11, figs. 15, 16.

Range in North Carolina: upper(?) Eocene, upper part of Castle Hayne limestone.

Occurrence: Rare.

Figured specimen: Pender County, well number 1, 47-70 feet, upper part of Castle Hayne limestone. Length 0.93 mm; height 0.46 mm. U.S.N.M. 129770.

Trachyleberis broussardi (Howe and Chambers)

Plate 3, Figure 9

Cythereis broussardi Howe and Chambers, 1935, Louisiana Dept. Cons. Geol. Bull. 5, p. 24, pl. 1, fig. 12; pl. 4, fig. 6.

Berquist, 1942, Mississippi Geol. Survey Bull. 49, Fossils; p. 106, pl. 11, fig. 7.

Range in North Carolina: upper Eocene, upper part of Castle Hayne limestone.

Occurrence: Rare.

Figured specimen: Onslow County, well number 1, 40-50 feet, upper part of Castle Hayne limestone. Length 0.50 mm; height 0.26 mm. U.S.N.M. 129771.

Trachyleberis pellucinoda (Swain)

Plate 3, Figure 10

Cythereis pellucinoda Swain, 1948, Maryland Dept. Geol., Mines and Water Res. Bull. 2, p. 200, pl. 14, figs. 1, 2.

Trachyleberis (?) *pellucinoda Swain*, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 34, pl. 4, fig. 24, pl. 5, fig. 10.

Range in North Carolina: middle Eocene, lower part of Castle Hayne limestone.

Occurrence: Abundant.

Figured specimen: Beaufort County, well number 4, 110-127 feet, lower part of Castle Hayne limestone. Length 0.44 mm; height 0.23 mm. U.S.N.M. 129772.

Trachyleberis bassleri (Ulrich)

Plate 3, Figure 15

Cythereis bassleri Ulrich, 1901, Maryland Geol. Survey, Eocene, p. 120, pl. 16, figs. 19-21.

Weller, 1907, Geol. Survey New Jersey, v. 4, p. 843, pl. 110, figs. 1-3.

? Cushman, 1925, Bull. Am. Assoc. Petroleum Geologists, v. 9, p. 302, pl. 8, figs. 3a-c.

Alexander, 1934, Jour. Paleontology, v. 8, p. 219-220.

Jennings, 1936, Bull. Am. Paleontology, v. 23, no. 78, p. 51, pl. 7, figs. 1a-b.

? Van den Bold, 1946, Contrib. to the Study of Ostracoda, p. 94, pl. 6, fig. 20.

Schmidt, 1948, Jour. Paleontology, v. 22, p. 422, pl. 64, fig. 13.

Swain, 1948, Maryland Geol. Survey, Bull. 2, p. 197, pl. 13, fig. 7.

Munsey, 1953, Jour. Paleontology, v. 27, p. 8, pl. 4, figs. 6, 7, 12-14.

Cythereis bassleri lata Jennings, 1936, Bull. Am. Paleontology, v. 23, no. 78, p. 52, pl. 7, figs. 2a-b.

Cythereis claibornensis Gooch, 1939, Jour. Paleontology, v. 13, p. 581, pl. 67, figs. 5, 6, 10.

Stephenson, 1946, Jour. Paleontology, v. 20, p. 336, pl. 45, fig. 4.

Cythereis bassleri reticulolira Schmidt, 1948, Jour. Paleontology, v. 22, p. 423, pl. 64, figs. 14, 15.

Cythereis plusculmenis, Schmidt, 1948, Jour. Paleontology, v. 22, p. 422, pl. 64, figs. 2-4.

Paracythereis potomaca Schmidt, 1948, Jour. Paleontology, p. 419, pl. 64, figs. 18-19.

Trachyleberis ? bassleri, Swain, 1951, Ostracoda from wells in North Carolina, pt. 1, Cenozoic Ostracoda: U. S. Geol. Survey Prof. Paper 234-A, p. 34-35, pl. 5, figs. 8, 11-15.

Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 13, pl. 7, figs. 10-14.

Range in North Carolina: middle Eocene, lower part of Castle Hayne limestone; lower Eocene and Paleocene, unnamed units; and Upper Cretaceous, Peedee formation.

Occurrence: Abundant in middle Eocene, lower Eocene, and Paleocene. Very rare in Upper Cretaceous.

Figured specimen: Beaufort County, well number 1, 120-140 feet, lower part of Castle Hayne limestone. Length 0.63 mm; height 0.36 mm. U.S.N.M. 129773.

Trachyleberis communis aquia (Schmidt)

Plate 3, Figure 16

Cythereis communis aquia Schmidt, 1948, Jour. Paleontology, v. 22, p. 420, pl. 64, figs. 10-12.

Range in North Carolina: lower Eocene and Paleocene, unnamed units.

Occurrence: Rare in lower Eocene, very rare in Paleocene.

Figured specimen: Pender County, well number 1, 125-128 feet, unnamed lower Eocene unit. Length 0.60 mm; height 0.28 mm; biconvexity 0.37 mm. U.S.N.M. 129774.

Trachyleberis spiniferrima (Jones and Sherborn)

Plate 3, Figure 17

Cythereis spiniferrima Jones and Sherborn, 1889, Suppl. Mon. Tert. Entom. England, Palaeontological Soc. London, p. 34, fig. 3.

Alexander, 1934, Jour. Paleontology, v. 8, p. 220, pl. 32, fig. 11.

Kline, 1943, Mississippi State Geol. Survey Bull. 53, p. 68, pl. 8, fig. 6.

Harris and Jobe, 1951, Microfauna Midway Ark., p. 72, pl. 13, figs. 4, 7.

Range in North Carolina: Paleocene, unnamed unit.

Occurrence: Rare.

Figured specimen: Bertie County, well number 2, 142-177 feet, unnamed Paleocene unit. Length 0.86 mm; height 0.45 mm. U.S.N.M. 129775.

Trachyleberis midwayensis (Alexander)

Plate 4, Figure 1

Cythereis midwayensis Alexander, 1934, Jour. Paleontology, v. 8, p. 219, pl. 33, fig. 1.

Harris and Jobe, 1951, Microfauna Midway Ark., p. 71, pl. 13, fig. 2.

Range in North Carolina: Paleocene, unnamed unit.

Occurrence: Common.

Figured specimen: Beaufort County, well number 4, 250-270 feet, unnamed Paleocene unit. Length 0.68 mm; height 0.42 mm. U.S.N.M. 129776.

Trachyleberis pidgeoni (Berry)

Plate 4, Figure 3

Cythcridea pidgeoni Berry, 1925, Am. Jour. Sci., 5th ser., no. 9, p. 485, figs. 7, 8.

Cythereis pidgeoni (Berry), Schmidt, 1948, Jour. Paleontology, v. 22, p. 421, pl. 62, figs. 2-6.

Trachyleberis pidgeoni (Berry), Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 36, pl. 6, fig. 1.

Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 14, pl. 7, figs. 26, 27.

Range in North Carolina: Upper Cretaceous, Peedee formation.

Occurrence: Abundant.

Figured specimen: Lenoir County, well number 5, 35-50 feet, Peedee formation. Length 0.59 mm; height 0.35 mm. U.S.N.M. 129777.

Trachyleberis gapensis (Alexander)

Plate 4, Figure 4

Cythereis gapensis Alexander, 1929, Texas Univ. Bull. 2907, p. 84, pl. 6, figs. 13, 14.

Trachyleberis gapensis (Alexander) Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 14, pl. 7, figs. 15-19.

Range in North Carolina: Upper Cretaceous, Peedee and Black Creek formations.

Occurrence: Common.

Figured specimen: Lenoir County, well number 3, 128-143 feet, Peedee formation. Length 0.58 mm; height 0.34 mm. U.S.N.M. 129778.

Trachyleberis communis (Israelsky)

Plate 4, Figure 5

Cythereis communis Israelsky, 1929, Arkansas Geol. Survey Bull. 2, p. 14, pl. 3a, figs. 9-13.

Alexander, 1929, Texas Univ. Bull. 2907, p. 101, pl. 9, fig. 18.

Jennings, 1936, Bull. Am. Paleontology, v. 23, no. 78, p. 52, pl. 7, fig. 3.

Schmidt, 1948, Jour. Paleontology, v. 22, p. 419, pl. 61, figs. 11-13.

Cythereis (Pterygocythereis) cf. *C. (P) communis* (Israelsky) Swain, 1948, Maryland Dept. Geol., Mines, and Water Res., Bull. 2, p. 207, pl. 14, figs. 5-7.

Trachyleberis communis (Israelsky) Brown, 1957, N. C. Dept. Cons, and Devel. Bull. 70, p. 14, pl. 3, figs. 10,11.

Range in North Carolina: Upper Cretaceous, Peedee formation.

Occurrence: Abundant.

Figured specimen: Brunswick County, well number 1, 176-188 feet, Peedee formation. Length 0.76 mm; height 0.42 mm. U.S.N.M. 129779.

Trachyleberis (?) *praecursora* Brown

Plate 4, Figure 6

Trachyleberis praecursora Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 15, pl. 7, figs. 20-25.

Range in North Carolina: Upper Cretaceous, Peedee formation.

Occurrence: Rare.

Figured specimen: Bertie County, well number 1, 185-206 feet, Peedee formation. Length 0.56 mm; height 0.27 mm. U.S.N.M. 129780.

Trachyleberis prestwichiana (Jones and Sherborn)

Plate 4, Figure 2

Cythereis prestwichiana Jones and Sherborn, 1887, Geol. Mag., p. 454, pl. 11, figs. 11a-b.

Jones and Sherborn, 1889, Suppl. Mon. Tert. Entom. England, Palaeontological Soc. London, p. 33, pl. 2, figs. 13-14.

Alexander, 1934, Jour. Paleontology, v. 8, p. 220, pl. 32, figs. 14, 15.

Kline, 1943, Mississippi Geol. Survey Bull. 53, p. 68, pl. 8, fig. 11.

Van den Bold, 1946, Contrib. to the Study of Ostracoda, p. 94, pl. 11, fig. 2.

Harris and Jobe, 1951, Microfauna Midway Ark., p. 71, pl. 13, fig. 3.

Munsey, 1953, Jour. Paleontology, v. 27, p. 8, pl. 4, figs. 3-5.

Range in North Carolina: Paleocene, unnamed unit.

Occurrence: Common.

Figured specimen: Chowan County, well number 1, 320-340 feet, unnamed Paleocene unit. Length 0.70 mm; height 0.35 mm. U.S.N.M. 129781.

Genus Leguminocythereis Howe, 1936

Leguminocythereis scarabaeus Howe and Law

Plate 6, Figure 9

Leguminocythereis scarabaeus Howe and Law, 1936, Louisiana Dept. Cons. Geo. Bull. 7, p. 63, pl. 4, figs. 12, 17, pl. 5, figs. 15-17.

Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 43, pl. 6, figs. 15, 16.

Range in North Carolina: upper(?) Eocene, upper part of Castle Hayne limestone.

Occurrence: Rare.

Figured specimen: Onslow County, well number 6, 162-190 feet, upper part of Castle Hayne limestone. Length 0.80 mm; height 0.42 mm. U.S.N.M. 129782.

Leguminocythereis whitei Swain

Plate 6, Figure 10

Leguminocythereis whitei Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 43, pl. 3, figs. 14, 16-18, pl. 4, fig. 1.

Malkin, 1953, Jour. Paleontology, v. 27, p. 785, pl. 80, figs. 7-12.

Range in North Carolina: post-Miocene and upper Miocene, Yorktown formation.

Occurrence: Common.

Figured specimen: Washington County, well number 1, 60-80 feet, Yorktown formation. Length 0.74 mm; height 0.34 mm; biconvexity 0.35 mm. U.S.N.M. 129783.

Genus Puriana Coryell and Fields, 1953

Puriana rugipunctata (Ulrich and Bassler)

Plate 4, Figure 10

Cythere rugipunctata Ulrich and Bassler, 1904, Maryland Geol. Survey, Miocene vol., p. 118, pl. 38, figs. 16, 17.

Cythereis rugipunctata (Ulrich and Bassler), Howe and others, 1935, Florida Geol. Survey, Bull. 13, p. 23, pl. 1, figs. 18, 20-22, pl. 4, figs. 22, 23.

Favella rugipunctata (Ulrich and Bassler), Edwards, 1944, Jour. Paleontology, v. 18, p. 524, pl. 88, figs. 5, 6.

Van den Bold, 1946, Contrib. to the study of Ostracoda, p. 100, pl. 10, fig. 3.

Van den Bold, 1950, Jour. Paleontology, v. 24, p. 86.

Trachyleberis ? rugipunctata (Ulrich and Bassler), Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 38, pl. 6, fig. 8.

Favella rugipunctata (Ulrich and Bassler), Malkin, 1953, Jour. Paleontology, v. 27, p. 797, pl. 82, fig. 24.

Puriana rugipunctata (Ulrich and Bassler), Puri, 1953, Jour. Paleontology, v. 27, p. 751.

Puri, 1953, Florida Geol. Survey, Bull. 36, p. 257, pl. 12, figs. 18, 19, text fig. 8K.

Range in North Carolina: upper Miocene, Yorktown formation.

Occurrence: Abundant.

Figured specimen: Washington County, well number 2, 65-80 feet, Yorktown formation. Length 0.65 mm; height 0.33 mm; biconvexity 0.29 mm. U.S.N.M. 129784.

Genus Pterygocythereis Blake, 1933

Pterygocythereis washingtonensis Swain

Plate 4, Figure 8

Pterygocythereis washingtonensis Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 41, pl. 4, fig. 21.

Range in North Carolina: middle Eocene, lower part of Castle Hayne limestone.

Occurrence: Common.

Figured specimen: Washington County, well number 1, 230-240 feet, lower part of Castle Hayne limestone. Length 0.62 mm; height 0.30 mm; biconvexity 0.27 mm. U.S.N.M. 129785.

Genus Platycythereis Triebel, 1940

Platycythereis costatana angula (Schmidt)

Plate 4, Figure 9

Cythereis costatana angula Schmidt, 1948, Jour. Paleontology, v. 22, p. 420, pl. 61, figs. 17, 18.

Platycythereis costatana angula (Schmidt) Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 15, pl. 6, figs. 22-25.

Range in North Carolina: Upper Cretaceous, Peedee formation.

Occurrence: Rare.

Figured specimen: Brunswick County, well number 1, 188-198 feet, Peedee formation. Length 0.74 mm; height 0.36 mm; biconvexity 0.23 mm. U.S.N.M. 129786.

Genus Velarocythere Brown, 1957

Velarocythere scuffeltonensis Brown

Plate 4, Figure 16

Velarocythere scuffeltonensis Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 21, pl. 5, figs. 5-9.

Range in North Carolina: Upper Cretaceous, Peedee formation.

Occurrence: Common.

Figured specimen: Duplin County, well number 4, 40-60 feet, Peedee formation. Length 0.74 mm; height 0.32 mm. U.S.N.M. 129787.

Velarocythere arachoides (Berry)

Plate 4, Figure 17

Cythere arachoides Berry, 1925, Am. Jour. Sci., 5th. ser., v. 9, p. 484, fig. 5.

Cythere rectangulapora Berry, 1925, Am. Jour. Sci., 5th. ser., v. 9, p. 483, fig. 4.

Brachycythere arachoides (Berry), Schmidt, 1948, Jour. Paleontology, v. 22, p. 415, pl. 62, figs. 13-16.

Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 81, pl. 9, fig. 22.

Velarocythere arachoides (Berry), Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 22, pl. 5, figs. 16-18.

Range in North Carolina: Upper Cretaceous, Peedee formation.

Occurrence: Abundant.

Figured specimen: Pitt County, well number 2, 34-66 feet, Peedee formation. Length 0.89 mm; height 0.43 mm. U.S.N.M. 129788.

Velarocythere legrandi Brown

Plate 5, Figure 1

Velarocythere legrandi Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 21, pl. 5, figs. 1-4.

Range in North Carolina: Upper Cretaceous, Peedee formation.

Occurrence: Very rare.

Figured specimen: Onslow County, well number 6, 780-810 feet, Peedee formation. Length 0.79 mm; height 0.39 mm. U.S.N.M. 129789.

Velarocythere caeumenata Brown

Plate 5, Figure 2

Velarocythere caeumenata Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 21, pl. 5, figs. 13-15.

Range in North Carolina: Upper Cretaceous, Peedee formation.

Occurrence: Common.

Figured specimen: Onslow County, well number 6, 740-750 feet, Peedee formation. Length 0.69 mm; height 0.35 mm; biconvexity 0.35 mm. U.S.N.M. 129790.

Velarocythere cikonata Brown

Plate 5, Figure 3

Velarocythere cikonata Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 22, pl. 5, figs. 10-12.

Range in North Carolina: Upper Cretaceous, Peedee formation.

Occurrence: Very rare.

Figured specimen: Onslow County, well number 3, 388-391 feet, Peedee formation. Length 0.75 mm; height 0.40 mm; biconvexity 0.41 mm, male. U.S.N.M. 129791.

Genus Actinocythereis Puri, 1953

The genus was introduced by Puri for *Cythereis*-type Ostracoda having the "Surface of the carapace ornamented with three distinct rows of vertically elongated spines" (Puri, 1953, p. 178).

Remarks: The status of the genus is uncertain because it cannot, as defined, be easily separated from *Trachyleberis* Brady. Eocene forms such as *Trachyleberis stenzeli* (Stephenson), *Trachyleberis hilgardi* (Howe and Garrett) or *Trachyleberis sicyristae* (Schmidt) could, with justification, be placed in either *Trachyleberis* Brady or *Actinocythereis* Puri using carapace ornamentation as a generic criterion. Puri restricted the range of the genus to Eocene through Miocene. Swain (1955, p. 634) points out that there are living representatives of this type ostracode. In addition, there are several Cretaceous forms of the genus *Trachyleberis* Brady that are of undoubted similarity to *Actinocythereis* Puri as now defined.

Actinocythereis exanthemata (Ulrich and Bassler)

Plate 3, Figure 4

Cythere exanthemata Ulrich and Bassler, 1904, Maryland Geol. Survey, Miocene vol.; p. 117, pl. 36, figs. 1-5.

Cythereis exanthemata marylandica Howe and Huff, 1935, Florida Dept. Cons. Geol. Bull. 13, p. 18, pl. 1, figs. 1-5, pl. 4, fig. 7.

Cythereis exanthemata (Ulrich and Bassler), van den Bold, 1946, Contrib. to the study of Ostracoda, p. 88, pl. 10, fig. 2.

Swain, 1948, Maryland Dept. Geol. Mines, and Water Res. Bull. 2, p. 204, pl. 12, figs. 14, 15.

Trachyleberis exanthemata (Ulrich and Bassler), Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 37, pl. 6, fig. 5.

Malkin, 1953, Jour. Paleontology, v. 27, p. 791, pl. 81, figs. 16, 19, 20.

Actinocythereis exanthemata (Ulrich and Bassler) Puri, 1953, Amer. Mid. Naturalist, v. 49, p. 179, pl. 2, figs. 4-8, text figs. E, F.

Actinocythereis exanthemata marylandica (Howe and Hough) Puri, 1953, Amer. Mid. Naturalist, v. 49, p. 181, pl. 2, fig. 3, text figs. C, D.

Actinocythereis exanthemata (Ulrich and Bassler) Puri, 1953, Florida Geol. Survey Bull. 36, p. 252, pl. 13, figs. 6-13.

Actinocythereis aff. A. exanthemata (Ulrich and Bassler), Swain, 1955, Jour. Paleontology, v. 29, p. 634, pl. 63, figs. 5a, b, 37, C, 38, 7a-c.

Range in North Carolina: upper Miocene, Yorktown formation and unnamed middle(?) Miocene unit.

Occurrence: Common.

Figured specimen: Beaufort County, well number 2, 40-50 feet, Yorktown formation. Length 0.98 mm; height 0.59 mm. U.S.N.M. 129792.

Actinocythereis mundorffi (Swain)

Plate 2, Figure 16

Trachyleberis mundorffi Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 36, pl. 5, fig. 19, pl. 6, fig. 4.

Range in North Carolina: upper Miocene, Yorktown formation.

Occurrence: Rare.

Figured specimen: Beaufort County, well number 2, 40-50 feet, Yorktown formation. Length 0.78 mm; height 0.35 mm. U.S.N.M. 129793.

Actinocythereis davidwhitei (Standnichenko)

Plate 3, Figure 14

Cythereis davidwhitei Stadnichenko, 1929, Jour. Paleontology, v. 1, p. 240, pl. 39, fig. 24.

Stephenson, 1946, Jour. Paleontology, v. 20, p. 336, pl. 44, fig. 5, pl. 45, fig. 12.

Cythereis quinquespinosa Sutton and Williams, 1939, Jour. Paleontology, v. 13, p. 566, pl. 63, figs. 10, 11.

Trachyleberis davidwhitei (Stadnichenko) Blake, 1950, Jour. Paleontology, v. 29, p. 180, pl. 30, fig. 27.

Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 33, pl. 4, fig. 19, pl. 5, figs. 6, 7.

Actinocythereis davidwhitei (Stadnichenko), Puri, 1953, Amer. Mid. Naturalist, v. 49, p. 182, pl. 2, fig. 10.

Range in North Carolina: upper(?), and middle Eocene, Castle Hayne limestone, and lower Eocene, unnamed unit.

Occurrence: Rare in upper(?) Eocene, common in middle Eocene, very rare in lower Eocene.

Figured specimen: Craven County, well number 3, 27-41 feet, Castle Hayne limestone. Length 1.04 mm; height 0.48 mm. U.S.N.M. 129794.

Actinocythereis siegristae (Schmidt)

Plate 3, Figure 12

Cythereis siegristae Schmidt, 1948, Jour. Paleontology, v. 22, p. 421, pl. 64, figs. 5-9.

Range in North Carolina: lower Eocene and Paleocene, unnamed units.

Occurrence: Common in lower Eocene, very rare in Paleocene.

Figured specimen: Martin County, well number 1, 48-95 feet, unnamed Paleocene unit. Length 0.89 mm; height 0.48 mm; biconvexity 0.37 mm. U.S.N.M. 129795.

Actinocythereis stenzeli (Stephenson)

Plate 3, Figure 13

Cythereis hilgardi Howe and Garrett, Stephenson, 1944, Jour. Paleontology, v. 18, p. 450, pl. 76, fig. 1.

Cythereis stenzeli Stephenson, 1946, Jour. Paleontology, v. 20, p. 340, pl. 45, fig. 5.

Trachyleberis stenzeli (Stephenson), Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 32, pl. 4, figs. 17, 18, 22, pl. 5, fig. 1.

Range in North Carolina: middle Eocene, lower part of Castle Hayne limestone, and lower Eocene, unnamed unit.

Occurrence: Common in middle Eocene, rare in lower Eocene.

Figured specimen: Craven County, well number 5, 60-80 feet, lower part of Castle Hayne limestone. Length 0.79 mm; height 0.42 mm. U.S.N.M. 129796.

Actinocythereis hilgardi (Howe and Garrett)

Plate 4, Figure 7

Cythereis hilgardi Howe and Garrett, 1934, Louisiana Dept. Cons. Geol. Bull. 4, p. 53, pl. 4, figs. 14, 15.

Trachyleberis hilgardi (Howe and Garrett), Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 31, pl. 4, figs. 14-16, 20, pl. 5, figs. 2-5, 16.

Range in North Carolina: middle Eocene, lower part of Castle Hayne limestone, and unnamed lower Eocene unit.

Occurrence: Abundant.

Figured specimen: Washington County, well number 1, 230-240 feet, lower part of Castle Hayne limestone. Length 0.94 mm; height 0.43 mm. U.S.N.M. 129797.

Genus Echinocythereis Puri, 1953

The genus was erected by Puri for *Cythereis*-type Ostracoda having the "Surface of the carapace ornamented with numerous small, rounded, spines roughly arranged in a concentric pattern." (Puri, 1953b, p. 259).

Remarks: As defined, the genus is uncertain because it is based on surface ornamentations that may or may not have generic significance.

Echinocythereis evax (Ulrich and Bassler)

Plate 2, Figure 15

Cythere evax Ulrich and Bassler, 1904, Maryland Geol. Survey, Miocene vol., p. 119, pl. 36, figs. 6-8.

Cythere evax oblongula Ulrich and Bassler, 1904, Maryland Geol. Survey, Miocene vol., p. 119, pl. 36, figs. 9, 10.

Cythereis evax (Ulrich and Bassler), van den Bold, 1946, Contrib. to the study of Ostracoda, p. 60, pl. 21, fig. 19.

Swain, 1948, Maryland Dept. Geol., Mines and Water Res., Bull. 2, p. 204, pl. 12, figs. 19, 20.

Trachyleberis evax (Ulrich and Bassler) Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 28, pl. 3, figs. 1-3.

Malkin, 1953, Jour. Paleontology, v. 27, p. 792, pl. 82, figs. 4, 5.

Echinoeythereis evax (Ulrich and Bassler), Puri, 1953, Florida Geol. Survey, Bull. 36, p. 261, pl. 12, fig. 1, text fig. 9c.

Range in North Carolina: upper Miocene, Yorktown formation, and unnamed Miocene(?) unit.

Occurrence: Rare.

Figured specimen: Perquimans County, well number 1, 46-55 feet, Yorktown formation. Length 0.95 mm; height 0.54 mm. U.S.N.M. 129798.

Echinocythereis garretti (Howe and McGuirt)

Plate 6, Figure 12

Cythereis garretti Howe and McGuirt, 1935, Florida Dept. Cons. Geol. Bull. 13, pl. 3, figs. 17-19, pl. 4, figs. 5, 15.

Buntonia ? cf. *B.* ? *garretti* (Howe and McGuirt), Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 39, pl. 3, fig. 6, pl. 4, figs. 4-6.

Echinocythereis garretti (Howe and McGuirt), Puri, 1953, Florida Geol. Survey Bull. 36, p. 260, pl. 12, figs. 2-5, text figs. 9a, b.

Range in North Carolina: upper Miocene, Yorktown formation.

Occurrence: Rare.

Figured specimen: Beaufort County, well number 8, 85-95 feet, Yorktown formation. Length 0.99 mm; height 0.56 mm; biconvexity 0.52 mm. U.S.N.M. 129799.

Echinocythereis planibasilis (Ulrich and Bassler)

Plate 8, Figure 11

Cythere planibasilis Ulrich and Bassler, 1904, Maryland Geol. Survey, Miocene vol., p. 99, pl. 38, figs. 1-3.

Buntonia ? *planibasilis* (Ulrich and Bassler), Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 39, pl. 3, figs. 4, 5.

Range in North Carolina: upper Miocene, Yorktown formation.

Occurrence: Rare.

Figured specimen: Beaufort County, well number 7, 70-80 feet, Yorktown formation. Length 0.80 mm; height 0.37 mm; biconvexity 0.38 mm. U.S.N.M. 129800.

Genus Murrayina Puri, 1953

Murrayina martini (Ulrich and Bassler)

Plate 3, Figure 3

Cythere martini Ulrich and Bassler, 1904, Maryland Geol. Survey, Miocene vol., p. 112, pl. 36, figs. 11-15.

Cythere producta Ulrich and Bassler, 1904, Maryland Geol. Survey, Miocene vol., p. 115, pl. 36, fig. 17, pl. 38, figs. 28-30.

Cythere micula Ulrich and Bassler, 1904, Maryland Geol. Survey, Miocene vol., p. 116, pl. 36, figs. 18-20.

Cythereis martini (Ulrich and Bassler), Swain, 1948, Maryland Dept. Geol., Mines and Water Resources, Bull. 2, p. 196, pl. 12, figs. 16, 17.

Traehyleberis ? *martini* (Ulrich and Bassler), Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 29, pl. 3, figs. 8, 15.

Trachyleberis martini (Ulrich and Bassler), Malkin, 1953, Jour. Paleontology, v. 27, p. 793, pl. 82, figs. 6-13.

Murrayina martini (Ulrich and Bassler), Puri, 1953, Florida Geol. Survey, Bull. 36, p. 256, pl. 12, figs. 11-13, text figs. 8e, f.

Range in North Carolina: upper Miocene, Yorktown formation.

Occurrence: Abundant.

Figured specimen: Washington County, well number 1, 120-140 feet, Yorktown formation. Length 0.62 mm; height 0.28 mm. U.S.N.M. 129801.

Genus Orionina Puri, 1953

Orionina vaughni (Ulrich and Bassler)

Plate 3, Figure 2

Cythere vaughni Ulrich and Bassler, 1904, Maryland Geol. Survey, Miocene vol., p. 109, pl. 38, figs. 25-27.

Cythereis vaughni (Ulrich and Bassler), Howe and others, 1935, Florida Dept. Cons., Geol. Bull. 13, p. 25, pl. 3, figs. 24, 25, pl. 4, fig. 13.

Coryell and Fields, 1937, Am. Mus. Nov. 956, p. 9, fig. 10a.

Edwards, 1944, Jour. Paleontology, v. 18, p. 552, pl. 87, figs. 27, 28.

Van den Bold, 1946, Contrib. to the study of Ostracoda, p. 88, pl. 10, fig. 1.

Trachyleberis vaughni (Ulrich and Bassler), Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 37, pl. 6, figs. 6, 7.

Malkin, 1953, Jour. Paleontology, v. 27, p. 794, pl. 82, fig. 14.

Orionina vaughni (Ulrich and Bassler), Puri, 1953, Florida Geol. Survey, Bull. 36, p. 254, pl. 12, figs. 15, 16, text figs. 8a-c.

Range in North Carolina: upper Miocene, Yorktown formation.

Occurrence: Abundant.

Figured specimen: Washington County, well number 1, 120-140 feet, Yorktown formation. Length 0.62 mm; height 0.28 mm. U.S.N.M. 129802.

Subfamily Hemicytherinae Puri, 1953

Genus Hemicythere Sars, 1925

Hemicythere conradi Howe and McGuirt

Plate 6, Figure 17

Hemicythere conradi Howe and McGuirt, 1935, Florida Dept. Cons. Geol. Bull. 13, p. 27, pl. 3, figs. 31-34, pl. 4, fig. 17.

Edwards, 1944, Jour. Paleontology, v. 18, p. 518, pl. 86, figs. 17, 18.

Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 42, pl. 6, figs. 9-12.

Puri, 1953, Jour. Wash. Acad. Sci., v. 43, p. 176, pl. 2, figs. 1, 2.

Malkin, 1953, Jour. Paleontology, v. 27, p. 796, pl. 82, figs. 16-18.

Puri, 1953, Florida Geol. Survey Bull. 36, p. 266.

Swain, 1955, Jour. Paleontology, v. 29, p. 635, pl. 62, figs. 3a-c.

Range in North Carolina: upper Miocene, Yorktown formation.

Occurrence: Abundant.

Figured specimen: Robeson County, well number 4, 36-54 feet, Yorktown formation. Length 0.54 mm; height 0.34 mm; biconvexity 0.29 mm. U.S.N.M. 129803.

Hemicythere confragosa Edwards

Plate 7, Figure 1

Hemicythere confragosa Edwards, 1944, Jour. Paleontology, v. 18, p. 518, pl. 86, figs. 23-26.

Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 43, pl. 6, figs. 13, 14.

Puri, 1953, Jour. Wash. Acad. Sci., v. 43, p. 176, pl. 1, figs. 4-6.

Range in North Carolina: upper Miocene, Yorktown formation.

Occurrence: Common.

Figured specimen: Robeson County, well number 4, 36-54 feet, Yorktown formation. Length 0.46 mm; height 0.26 mm. U.S.N.M. 129804.

Hemicythere laevicula Edwards

Plate 7, Figure 2

Hemicythere laevicula Edwards, 1944, Jour. Paleontology, v. 18, p. 518, pl. 86, figs. 27-30.

Puri, 1953, Jour. Wash. Acad. Sci., v. 43, p. 174, pl. 1, figs. 1, 2.

Range in North Carolina: upper Miocene, Yorktown formation.

Occurrence: Very rare.

Figured specimen: Beaufort County, well number 5, 90-100 feet, Yorktown formation. Length 0.57 mm; height 0.33 mm; biconvexity 0.22 mm. U.S.N.M. 129805.

Hemicythere schmidtae Malkin

Plate 3, Figure 1

Trachyleberis (?) cf. *T.* (?) *angulata* (Sars), Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 29, pl. 3, figs. 9-12.

Hemicythere schmidtae Malkin, 1953, Jour. Paleontology, v. 27, p. 796, pl. 82, figs. 19-23.

Range in North Carolina: upper Miocene, Yorktown formation and unnamed middle (?) Miocene unit.

Occurrence: Abundant.

Figured specimen: Carteret County, well number 2, 70-80 feet, Yorktown formation. Length 0.68 mm; height 0.37 mm. U.S.N.M. 129806.

Subfamily Loxoconchinae Sars, 1925
Genus Loxoconcha Sars, 1866

Loxoconcha purisubrhomboidea Edwards

Plate 6, Figure 1

Loxoconcha subrhomboidea Edwards, 1944, Jour. Paleontology, v. 18, p. 527, pl. 88, figs. 28-32.

Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 25, pl. 2, figs. 18, 19.

Malkin, 1953, Jour. Paleontology, v. 27, p. 787.

Loxoconcha purisubrhomboidea Edwards, Puri, 1953, Jour. Paleontology, v. 27, p. 750.

Puri, 1953, Florida Geol. Survey Bull. 36, p. 274, pl. 10, fig. 8, text fig. 10h.

Range in North Carolina: upper Miocene, Yorktown formation.

Occurrence: Abundant.

Figured specimen: Beaufort County, well number 6, 70-80 feet, Yorktown formation. Length 0.61 mm; height 0.35 mm. U.S.N.M. 129807.

Loxoconcha reticularis Edwards

Plate 6, Figure 2

Loxoconcha reticularis Edwards, 1944, Jour. Paleontology, v. 18, p. 527, pl. 88 figs. 26, 27.

Malkin, 1953, Jour. Paleontology, v. 27, p. 786, pl. 80, figs. 13-17.

Puri, 1953, Florida Geol. Survey Bull. 36, p. 274, pl. 10, fig. 7, text fig. 10e.

Loxoconcha cf. *L. reticularis* Edwards, Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 26.

Range in North Carolina: upper Miocene, Yorktown formation.

Occurrence: Common.

Figured specimen: Beaufort County, well number 5, 100-110 feet, Yorktown formation. Length 0.42 mm; height 0.23 mm. U.S.N.M. 129808.

Loxoconcha creolensis Howe and Chambers

Plate 6, Figure 3

Loxoconcha creolensis Howe and Chambers, 1935, Louisiana Dept. Cons. Geol. Bull. 5, p. 40, pl. 5, fig. 13.

Swain, 1948, Maryland Dept. Geol., Mines, and Water Res., Bull. 2, p. 194, pl. 12, fig. 13.

Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 27, pl. 2, fig. 15.

Range in North Carolina: upper (?) and middle Eocene, Castle Hayne limestone.

Occurrence: Common.

Figured specimen: Beaufort County, well number 7, 160-170 feet, Castle Hayne limestone. Length 0.40 mm; height 0.28 mm. U.S.N.M. 129809.

Loxoconcha jacksonensis Howe and Chambers

Plate 6, Figure 4

Loxoconcha jacksonensis Howe and Chambers, 1935, Louisiana Dept. Cons. Devel. Geol. Bull. 5, p. 41, pl. 4, fig. 20, pl. 5, fig. 14, pl. 6, figs. 8, 9.

Berquist, 1942, Mississippi State Geol. Survey Bull. 49, Fossils; p. 109, pl. 11, fig. 18.

Range in North Carolina: upper(?) and middle Eocene, Castle Hayne limestone.

Occurrence: Common.

Figured specimen: Onslow County, well number 1, 40-50 feet, Castle Hayne limestone. Length 0.38 mm; height 0.27 mm. U.S.N.M. 129810.

Loxoconcha claibornensis Murray

Plate 6, Figure 5

Loxoconcha claibornensis Murray, 1938, Jour. Paleontology, v. 12, p. 588, pl. 68, figs. 2, 19.

Range in North Carolina: upper(?) and middle Eocene, Castle Hayne limestone.

Occurrence: Rare.

Figured specimen: Craven County, well number 8, 170-180 feet, Castle Hayne limestone. Length 0.38 mm; height 0.18 mm. U.S.N.M. 129811.

Loxoconcha seraphae Brown

Plate 6, Figure 6

Loxoconcha seraphae Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 23, pl. 6, figs. 9, 11.

Range in North Carolina: Upper Cretaceous, Peedee formation.

Occurrence: Rare.

Figured specimen: Lenoir County, well number 2, 125-137 feet, Peedee formation. Length 0.43 mm; height 0.25 mm. U.S.N.M. 129812.

Loxoconcha neuseensis Brown

Plate 6, Figure 7

Loxoconcha neuseensis Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 23, pl. 6, fig. 10.

Range in North Carolina: Upper Cretaceous, Peedee formation.

Occurrence: Rare.

Figured specimen: Onslow County, well number 6, 780-810 feet, Peedee formation. Length 0.45 mm; height 0.23 mm. U.S.N.M. 129813.

Loxoconcha sp. *A*

Plate 6, Figure 8

Range in North Carolina: upper(?) Eocene, upper part of Castle Hayne limestone.

Occurrence: Common.

Figured specimen: Jones County, well number 1, 23-45 feet, upper part of Castle Hayne limestone. Length 0.39 mm; height 0.22 mm. U.S.N.M. 129814.

Loxoconcha cf. *L. corrugata* Alexander

Plate 8, Figure 10

Loxoconcha corrugata Alexander, 1934, Jour. Paleontology, v. 8, p. 228, pl. 33, fig. 13.

Range in North Carolina: unnamed Paleocene unit.

Occurrence: Rare.

Figured specimen: Martin County, well number 1, 48-95 feet. Length 0.38 mm; height 0.21 mm. U.S.N.M. 129815.

Genus Cytheromorpha Hirschman, 1909

Cytheromorpha cf. *C. cocenica* Stephenson

Plate 8, Figure 12

Cytheromorpha cocenica Stephenson, 1946, Jour. Paleontology, v. 20, p. 311, pl. 43, fig. 9.

Cytheromorpha cf. *C. cocenica* Stephenson, Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 49, pl. 7, fig. 20.

Range in North Carolina: middle Eocene, lower part of Castle Hayne limestone.

Occurrence: Common.

Figured specimen: Beaufort County, well number 3, 132-150 feet, lower part of Castle Hayne limestone. Length 0.64 mm; height 0.26 mm. U.S.N.M. 129816.

Cytheromorpha sp. aff. *C. scrobiculata* Alexander

Plate 7, Figure 8

Cytheromorpha scrobiculata Alexander, 1934, Jour. Paleontology, v. 8, p. 223, pl. 32, fig. 19.
Kline, 1943, Mississippi State Geol. Survey Bull. 53, p. 69, pl. 8, fig. 8.
Harris and Jobe, 1951, Microfauna Midway Ark., p. 72, pl. 13, fig. 5.

Range in North Carolina: Paleocene, unnamed unit.
Occurrence: Very rare.
Figured specimen: Chowan County, well number 1, 400-420 feet, unnamed Paleocene unit. Length 0.35 mm; height 0.22 mm. U.S.N.M. 129817.

Cytheromorpha warneri Howe and Spurgeon

Plate 7, Figure 9

Cytheromorpha warneri Howe and Spurgeon, 1935, Florida Dept. Cons. Geol. Bull. 13, p. 11, pl. 2, figs. 5, 8, 9, pl. 4, fig. 4.
Cytheromorpha cf. *C. warneri* Howe and Spurgeon, Swain, 1951, U. S. Geol. Survey Prof. Paper 123-A, p. 49, pl. 7, figs. 18, 19.
Cytheromorpha warneri Howe and Spurgeon, Malkin, 1953, Jour. Paleontology, v. 27, p. 787, pl. 80, figs. 18, 19.
Puri, 1953, Florida Geol. Survey Bull. 36, p. 277, pl. 6, figs. 5-7, text figs. 11f, g.

Range in North Carolina: upper Miocene, Yorktown formation.
Occurrence: Rare.
Figured specimen: Bertie County, well number 2, 21-40 feet, Yorktown formation. Length 0.59 mm; height 0.26 mm; biconvexity 0.20 mm. U.S.N.M. 129818.

Subfamily Cytherettinae Triebel, 1952
Genus Cytheretta Muller, 1894
Cytheretta alexanderi Howe and Chambers

Plate 6, Figure 14

Cytheretta alexanderi Howe and Chambers, 1935, Louisiana Dept. Cons. Geol. Bull. 5, p. 45, pl. 5, figs. 17-21, pl. 6, figs. 27, 28.
Berquist, 1942, Mississippi State Geol. Survey Bull. 49, p. 109, pl. 11, fig. 20.
Blake, 1950, Jour. Paleontology, v. 24, p. 177, pl. 30, figs. 1-3.
Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 47, pl. 6, figs. 23-25.

Range in North Carolina: upper(?) and middle Eocene, Castle Hayne limestone.
Occurrence: Common in upper(?) Eocene, very rare in middle Eocene.
Figured specimen: Jones County, well number 1, 53-87 feet, Castle Hayne limestone. Length 0.74 mm; height 0.40 mm; biconvexity 0.34 mm. U.S.N.M. 129819.

Cytheretta reticulata Edwards

Plate 6, Figure 15

Cytheretta reticulata Edwards, 1944, Jour. Paleontology, v. 18, p. 525, pl. 88, figs. 7-10.

Range in North Carolina: upper Miocene, Yorktown formation.
Occurrence: Rare.
Figured specimen: Beaufort County, well number 7, 70-80 feet, Yorktown formation. Length 1.17 mm; height 0.45 mm. U.S.N.M. 129820.

Genus Basslerites Howe, 1937
Basslerites giganticus Edwards

Plate 6, Figure 16

Basslerites giganticus Edwards, 1944, Jour. Paleontology, p. 521, pl. 87, figs. 19-23.
Basslerites cf. *B. giganticus* Edwards, Puri, 1953, Florida Geol. Survey Bull. 36, p. 280, pl. 8, fig. 12, text fig. 11L.

Range in North Carolina: upper Miocene, Yorktown formation.
Occurrence: Very rare.
Figured specimen: Martin County, well number 2, 105-185 feet, Yorktown formation. Length 0.86 mm; height 0.48 mm; biconvexity 0.43 mm. U.S.N.M. 129821.

Subfamily Cytherideidnae Puri, 1952
Genus Cushmanidea Blake, 1933
Cushmanidea ashermani (Ulrich and Bassler)

Plate 8, Figure 9

Cytheridcis ashermani Ulrich and Bassler, 1904, Maryland Geol. Survey, Miocene vol., p. 126, pl. 37, figs. 10-16.
Howe and others, 1935, Florida Dept. Cons. Geol. Bull. 13, p. 14, pl. 3, figs. 8, 10.
Edwards, 1944, Jour. Paleontology, v. 18, p. 514, pl. 86, figs. 1-4.
Swain, 1948, Maryland Dept. Geol., Mines and Water Res., Bull. 2, p. 195, pl. 13, fig. 1.
Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 19.
Puri, 1952, Jour. Paleontology, v. 26, p. 910, pl. 130, figs. 4-8, text figs. 1, 2.
Malkin, 1953, Jour. Paleontology, v. 27, p. 778, pl. 78, figs. 1-13.
Cytheridcis semicurcularis Ulrich and Bassler, 1904, Maryland Geol. Survey, Miocene vol., p. 127, pl. 37, figs. 18-20.
Howe and others, 1935, Florida Dept. Cons. Geol. Bull. 13, p. 14.
Cytheridcis longula Ulrich and Bassler, 1904, Maryland Geol. Survey, Miocene vol., p. 128, pl. 37, figs. 21-27.
Swain, 1948, Maryland Dept. Geol., Mines and Water Res., Bull. 2, p. 195, pl. 14, fig. 2.
Swain, 1951, U. S. Geol. Survey Prof. Paper 234-A, p. 19.
Cytheridcis cylindrica Ulrich and Bassler, 1904, Maryland Geol. Survey, Miocene vol., p. 126, pl. 37, fig. 17.

Range in North Carolina: upper Miocene, Yorktown formation.
Occurrence: Common.
Figured specimen: Beaufort County, well number 6, 120-130 feet, Yorktown formation. Length 0.80 mm; height 0.39 mm. U.S.N.M. 129822.

Remarks: Howe (1955, p. 56) states that the genus *Cytheridcis* Jones is dead and that, "Many of the more than 100 species which have been described under the name *Cytheridcis* should be transferred to *Cushmanidea* Blake, 1933, or *Pontocythere* Dubowsky, 1939."

Subfamily Bythocytherinae Sars, 1926
Genus Monoceratina Roth, 1928
Monoceratina alexanderi Howe and Chambers

Plate 4, Figure 11

Monoceratina alexanderi Howe and Chambers, 1935, Louisiana Dept. Cons. Geol. Bull. 5, p. 21, pl. 3, fig. 19, pl. 4, fig. 21.
Blake, 1950, Jour. Paleontology, v. 24, p. 183, pl. 29, fig. 7.

Range in North Carolina: upper(?) Eocene, upper part of Castle Hayne limestone.
Occurrence: Common.
Figured specimen: Onslow County, well number 1, 100-110 feet, upper part of Castle Hayne limestone. Length 0.66 mm; height 0.31 mm U.S.N.M. 129823.

Genus Orthonotacythere Alexander, 1933
Orthonotacythere cristata Alexander

Plate 4, Figure 12

Orthonotacythere cristata Alexander, 1934, Jour. Paleontology, v. 8, p. 65, pl. 8, fig. 11.
Alexander, 1934, Jour. Paleontology, v. 8, p. 232.
Harris and Jobe, 1951, Microfauna Midway Ark., p. 75, pl. 14, fig. 10.

Range in North Carolina: Paleocene, unnamed unit.
Occurrence: Rare.
Figured specimen: Beaufort County, well number 1, 210-215 feet, unnamed Paleocene unit. Length 0.60 mm; height 0.33 mm. U.S.N.M. 129824.

Orthonotacythere hannai (Israelsky)

Plate 4, Figure 13

Cytheridea ? hannai Israelsky, 1929, Arkansas Geol. Bull. 2, app; p. 12, pl. 2 A, fig. 10.
Cytheropteron hannai (Israelsky) Alexander, 1929, Texas Univ. Bull. 2907, p. 105, pl. 9, fig. 16.
Orthonotacythere hannai (Israelsky) Alexander, 1933; Jour. Paleontology, v. 7, p. 200, pl. 25, fig. 1, pl. 26, fig. 6, pl. 27, fig. 14.
Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 24, pl. 6, figs. 3-5.

Range in North Carolina: Upper Cretaceous, Peedee and Black Creek formations.
Occurrence: Rare.
Figured specimen: New Hanover County, well number 4, 140-200 feet, Peedee formation. Length 0.61 mm; height 0.33 mm. U.S.N.M. 129825.

Orthonotacythere tarensis Brown

Plate 4, Figure 15

Orthonotacythere tarensis Brown, 1957, N. C. Dept. Cons. and Devel. Bull. 70, p. 24, pl. 6, figs. 1, 2.

Range in North Carolina: Upper Cretaceous, Black Creek formation.
Occurrence: Very rare.
Figured specimen: Greene County, well number 1, 87-91 feet, Black Creek formation. Length 0.63 mm; height 0.31 mm; biconvexity 0.23 mm. U.S.N.M. 129826.

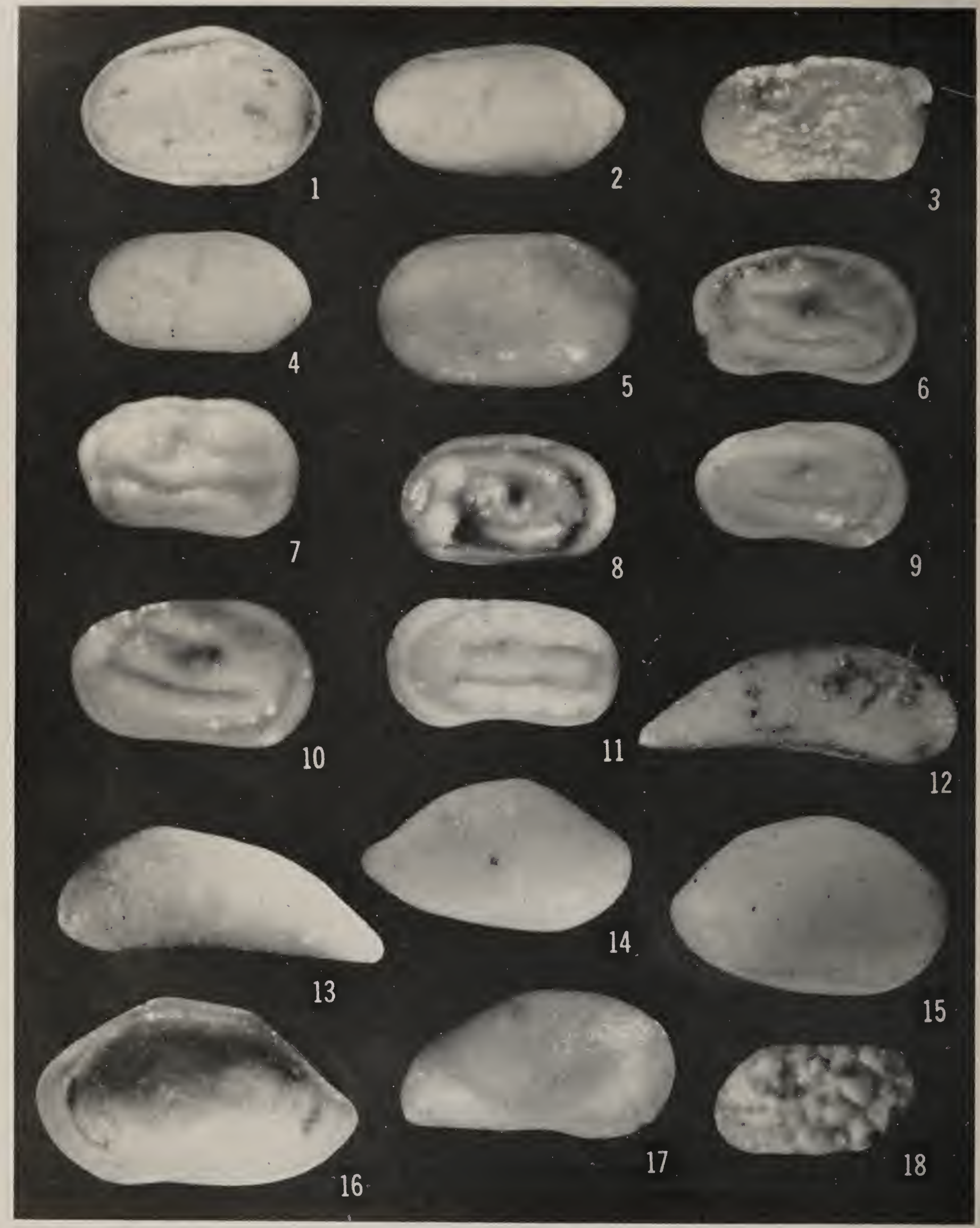
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Plate 1

Figures

1. *Cytherella ovata* (Roemer). Left side view of a complete specimen, x 72, Peedee formation, Columbus County, well number 1, 110-120 feet. U.S.N.M. 129705 (p. 56)
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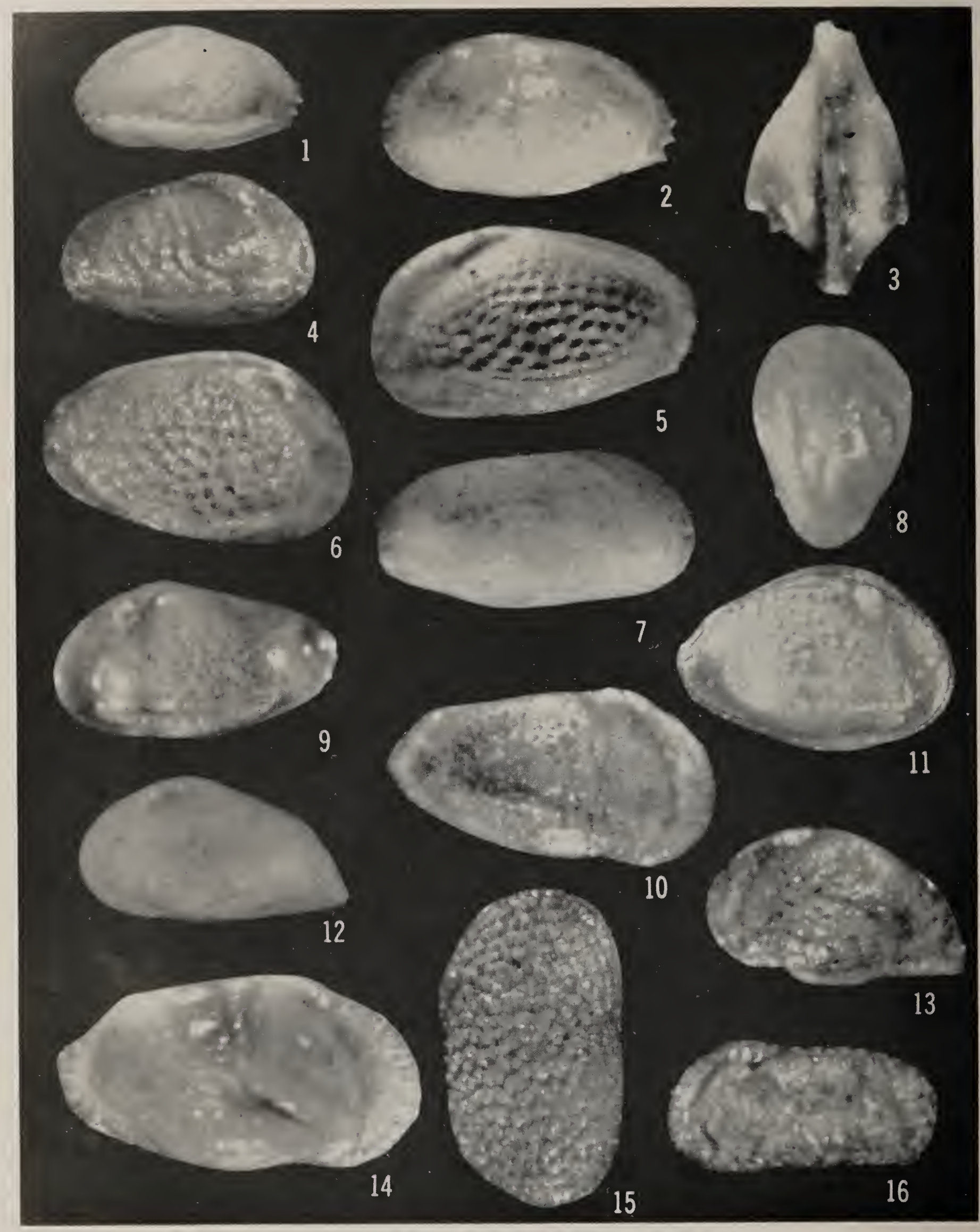
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Plate 2

Figures

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8. *Brachycythere formosa* Alexander. Left valve, x 73, unnamed Paleocene unit, Chowan County, well number 1, 340-360 feet. U.S.N.M. 129755 (p. 61)
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10. *Brachycythere nausiformis* Swain. Right valve exterior of a male dimorph, x 69, Black Creek formation, New Hanover County, well number 4, 840-900 feet. U.S.N.M. 129757 (p. 61)
11. *Brachycythere sphenoides* (Reuss). Right side view of a complete specimen, x 65, Black Creek formation, New Hanover County, well number 4, 849-900 feet. U.S.N.M. 129758 (p. 61)
12. *Brachycythere ledaforma* (Israelsky). Left side view of a complete carapace, x 86, Black Creek formation, Greene County, well number 1, 91-101 feet. U.S.N.M. 129759 (p. 61)
13. *Brachycythere raleighensis* Brown. Left side view of a complete carapace, x 81, Black Creek formation, Lenoir County, well number 3, 134-144 feet. U.S.N.M. 129760 (p. 61)
14. *Brachycythere plena* Alexander. Exterior view of a right valve, x 63, unnamed Paleocene unit, Bertie County, well number 7, 70-83 feet. U.S.N.M. 129761 (p. 61)
15. *Echinocythereis evax* (Ulrich and Bassler). Exterior view of a right valve, x 62, Yorktown formation, Perquimans County, well number 1, 46-55 feet. U.S.N.M. 129798 (p. 65)
16. *Actinocythereis mundorffi* (Swain). Left side view of a complete specimen, x 65, Yorktown formation, Hertford County, well number 1, 40-50 feet. U.S.N.M. 129793 (p. 64)

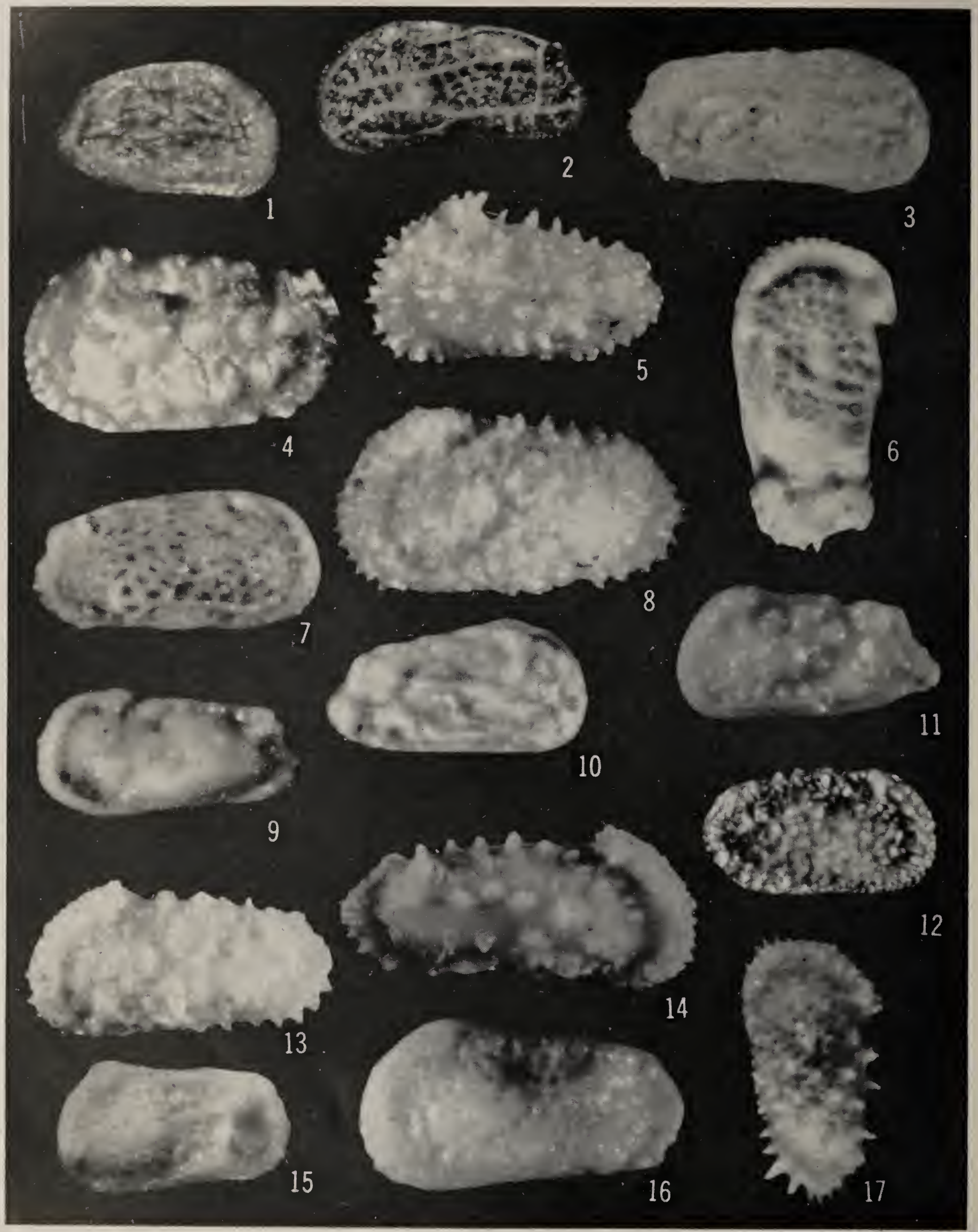
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Plate 3

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1. *Hemicythere schmidtae* Malkin. Exterior view of a right valve, x 80, Yorktown formation, Carteret County, well number 2, 70-80 feet. U.S.N.M. 129806 (p. 66)
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5. *Trachyleberis* sp. *A*. Left side view of a complete carapace, x 84, Pender County, well number 1, 47-70 feet. U.S.N.M. 129767 (p. 62)
6. *Trachyleberis* sp. *B*. Left side view of a complete carapace, x 86, Pender County, well number 1, 70-73 feet. U.S.N.M. 129768 (p. 62)
7. *Trachyleberis* sp. *C*. Right side view of a complete specimen, x 94, Brunswick County, well number 1, 59-62 feet. U.S.N.M. 129769 (p. 62)
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10. *Trachyleberis pellucinoda* Swain. Right side view of a complete specimen, x 101, lower part of Castle Hayne limestone, Beaufort County, well number 4, 110-127 feet. U.S.N.M. 129772 (p. 62)
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13. *Actinocythereis stenzeli* (Stephenson). Left side view of a complete specimen, x 69, lower part of Castle Hayne limestone, Craven County, well number 5, 60-80 feet. U.S.N.M. 129796 (p. 65)
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16. *Trachyleberis communis aquia* (Schmidt). Left side view of an abraded specimen, x 88, unnamed lower Eocene unit, Pender County, well number 1, 125-128 feet. U.S.N.M. 129774 (p. 62)
17. *Trachyleberis spiniferrima* (Jones and Sherborn). Exterior view of a left valve, x 72, unnamed Paleocene unit, Bertie County, well number 2, 142-177 feet. U.S.N.M. 129775 (p. 62)

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Plate 4

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1. *Trachyleberis midwayensis* (Alexander). Right side view of a complete specimen, x 84, unnamed Paleocene unit, Beaufort County, well number 4, 250-270 feet. U.S.N.M. 129776 (p. 63)
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14. *Orthonotacythere suleata* Brown. Left side view of a complete specimen, x 80, Black Creek formation, Greene County, well number 1, 97-101 feet. U.S.N.M. 129827 (p. 68)
15. *Orthonotacythere tarensis* Brown. Left side view of a complete carapace, x 84, Greene County, well number 1, 97-101 feet. U.S.N.M. 129826 (p. 67)
16. *Velarocythere scuffeltonensis* Brown. Left side view of a complete specimen, x 96, Peedee formation, Duplin County, well number 4, 40 feet. U.S.N.M. 129787 (p. 64)
17. *Velarocythere arachoides* (Berry). Exterior view of a left valve, x 75, Pitt County, well number 2, 34-66 feet. U.S.N.M. 129788 (p. 64)

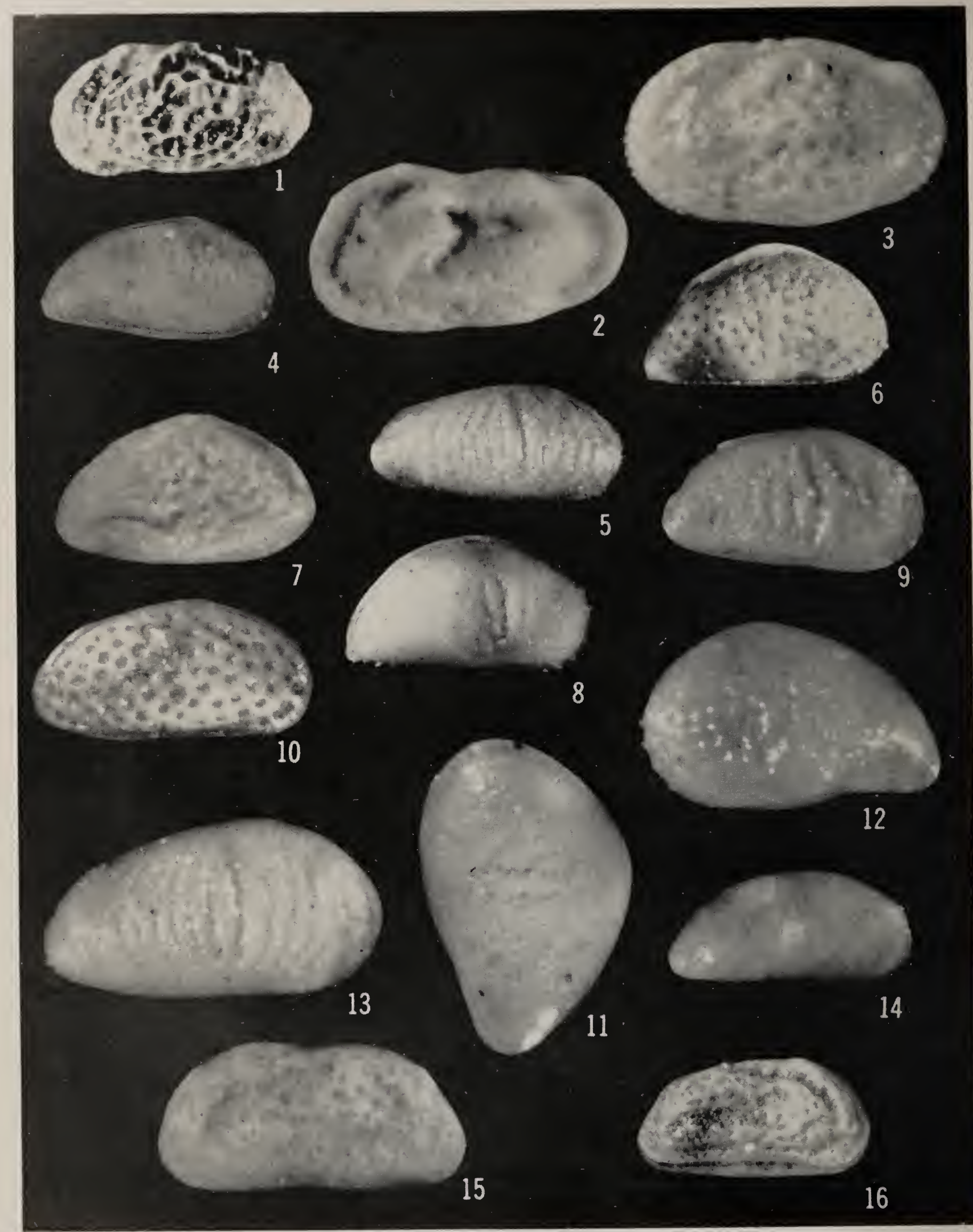
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Plate 5

Figures

1. *Velarocythere leyrandi* Brown. Exterior view of a left valve, male, x 60, Peedee formation, Onslow County, well number 6, 780-810 feet. U.S.N.M. 129789 (p. 64)
2. *Velarocythere cacumenata* Brown. Left side view of a male dimorph, x 86, Peedee formation, Onslow County, well number 6, 740-750 feet. U.S.N.M. 129790 (p. 64)
3. *Velarocythere eikonata* Brown. Left side view of a female dimorph, x 80, Peedee formation, Onslow County, well number 3, 388-391 feet. U.S.N.M. 129791 (p. 64)
4. *Cytheridea (Haploeytheridea) montgomeryensis* Howe and Chambers. Right side view of a male dimorph, x 83, Castle Hayne limestone, Beaufort County, well number 4, 127-147 feet. U.S.N.M. 129721 (p. 57)
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7. *Cytheridea (Haploeytheridea) fabaformis* (Berry). Right side view of a female dimorph, x 100, Peedee formation, New Hanover County, well number 5, 165-169 feet. U.S.N.M. 129723 (p. 58)
8. *Cytheridea (Haplocytheridea) monmouthensis* (Berry). Right side view of a male dimorph, x 79, Black Creek formation, Pitt County, well number 2, 121-132 feet. U.S.N.M. 129725 (p. 58)
9. *Cytheridea (Haploeytheridea) carolinensis* Brown. Right side view of a complete specimen with the dorsal margin of the left valve broken, posterad, x 88, Peedee formation, Lenoir County, well number 3, 68-84 feet. U.S.N.M. 129726 (p. 58)
10. *Cytheridea (Haploeytheridea) eouneilli* Brown. Right side view of a female dimorph, x 88, Peedee formation, New Hanover County, well number 1, 238-248 feet. U.S.N.M. 129727 (p. 58)
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12. *Cytheridea (Haploeytheridea) hopkinsi* Howe and Garrett. Left side view of a complete specimen, x 93, unnamed Paleocene unit, Chowan County, well number 1, 360-370 feet. U.S.N.M. 129729 (p. 58)
13. *Cytheridea (Haplocytheridea) moodyi* Howe and Garrett. Exterior view of a right valve, x 88, unnamed Paleocene unit, Chowan County, well number 1, 390 feet. U.S.N.M. 129730 (p. 58)
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Plate 6

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1. *Loxoconcha purisubrhomboidea* Edwards. Exterior view of a left valve, x 88, Yorktown formation, Beaufort County, well number 6, 70-80 feet. U.S.N.M. 129807 (p. 66)
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3. *Loxoconcha creolensis* Howe and Chambers. Left side view of a complete specimen, x 100, Castle Hayne limestone, Beaufort County, well number 7, 160-170 feet. U.S.N.M. 129809 (p. 66)
4. *Loxoconcha jacksonensis* Howe and Chambers. Right side view of a complete specimen, x 120, Castle Hayne limestone, Onslow County, well number 1, 40-50 feet. U.S.N.M. 129810 (p. 66)
5. *Loxoconcha claibornensis* Murray. Left side view of a complete specimen, x 105, Castle Hayne limestone, Craven County, well number 8, 170-180 feet. U.S.N.M. 129811 (p. 66)
6. *Loxoconcha seraphae* Brown. Left side view of a complete specimen, x 116, Peedee formation, well number 3, 125-128 feet. U.S.N.M. 129812 (p. 66)
7. *Loxoconcha neusensis* Brown. Right side view of a complete specimen, x 115, Peedee formation, well number 6, 780-810 feet. U.S.N.M. 129813 (p. 66)
8. *Loxoconcha* sp. *A*. Exterior view of a left valve, x 115, upper part of Castle Hayne limestone, Jones County, well number 1, 23-45 feet. U.S.N.M. 129814 (p. 66)
9. *Leguminocythereis scarabaeus* Howe and Law. Exterior view of a left valve, x 81, upper part of Castle Hayne limestone, Onslow County, well number 6, 162-190 feet. U.S.N.M. 129782 (p. 63)
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13. *Buntonia* cf. *B. lacunosa* (Jones). Right side view of a complete shell, x 70, lower part of Castle Hayne limestone, Craven County, well number 7, 100-138 feet. U.S.N.M. 129830 (p. 68)
14. *Cytheretta alexanderi* Howe and Chambers. Right side view of a complete specimen, x 85, Castle Hayne limestone, Jones County, well number 1, 53-87 feet. U.S.N.M. 129819 (p. 67)
15. *Cytheretta reticulata* Edwards. Exterior view of a right valve, x 51, Beaufort County, well number 7, 70-80 feet. U.S.N.M. 129820 (p. 67)
16. *Basslerites giganticus* Edwards. Dorsal view of a complete specimen, x 75, Yorktown formation, Martin County, well number 2, 105-185 feet. U.S.N.M. 129821 (p. 67)
17. *Hemicythere conradi* Howe and McGuirt. Left side view of a complete specimen, x 100, Yorktown formation, Robeson County, well number 4, 25-35 feet. U.S.N.M. 129803 (p. 65)

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Plate 7

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1. *Hemicythere confragosa* Edwards. Left side view of a complete specimen, x 117, Yorktown formation, Robeson County, well number 4, 36-54 feet. U.S.N.M. 129804 (p. 66)
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3. *Cytherura* sp. aff. *C. washburni* Stephenson. Left side view of a complete specimen, x 111, lower part of Castle Hayne limestone, Washington County, well number 1, 240-250 feet. U.S.N.M. 129737 (p. 59)
4. *Cytherura glossensis* Brown. Left side view of a complete specimen, x 123, Peedee formation, Brunswick County, well number 1, 188-198 feet. U.S.N.M. 129738 (p. 59)
5. *Cytherura elongata* Edwards. Left side view of a complete specimen, x 94, Yorktown formation, Beaufort County, well number 7, 70-80 feet. U.S.N.M. 129739 (p. 59)
6. *Cytherura* sp. aff. *C. oxycruris* Munsey. Left side view of a complete specimen, x 115, unnamed Paleocene unit, Chowan County, well number 1, 360-370 feet. U.S.N.M. 129740 (p. 59)
7. *Cythcrura* sp. *B*. Left side view of a complete carapace, x 101, upper part of Castle Hayne limestone, Onslow County, well number 3, 73-83 feet. U.S.N.M. 129741 (p. 59)
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9. *Cytheromorpha warneri* Howe and Spurgeon. Right side view of a complete carapace, x 103, Yorktown formation, Bertie County, well number 2, 21-40 feet. U.S.N.M. 129818 (p. 67)
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11. *Cytheropteron (Cytheropteron)* sp. *A*. Ventral view of a complete specimen, x 102, upper part of Castle Hayne limestone, Jones County, well number 1, 45-53 feet. U.S.N.M. 129744 (p. 60)
12. *Cytheropteron (Cytheropteron) penderensis* Brown. Exterior view of a right valve, x 94, Peedee formation, New Hanover County, well number 1, 310-343 feet. U.S.N.M. 129745 (p. 60)
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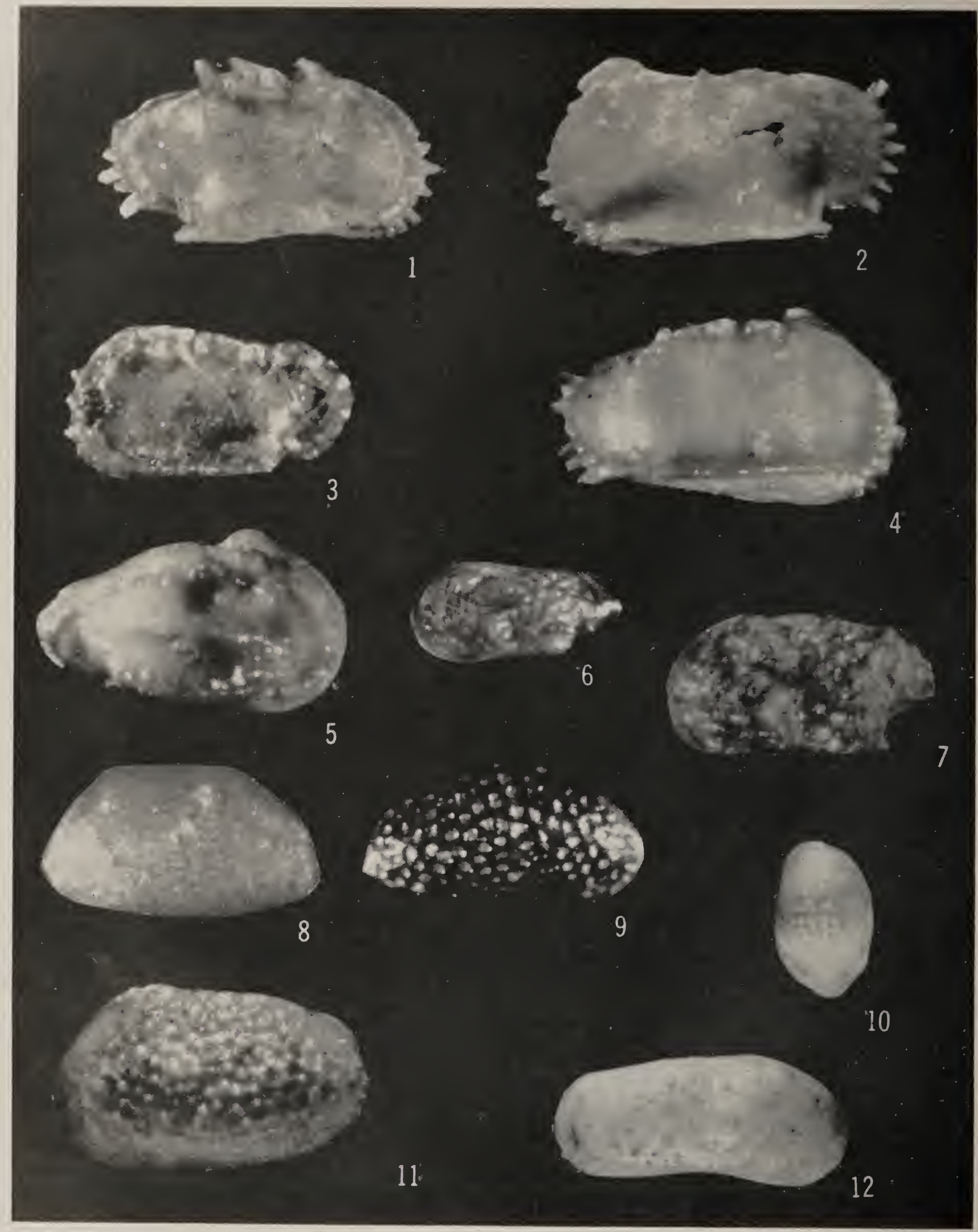
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Plate 8

Figures

1. *Alatacythere alata atlantica* (Schmidt). Exterior view of a right valve, x 56, Peedee formation, Onslow County, well number 3, 307-319 feet. U.S.N.M. 129762 (p. 61)
2. *Altatcythere lemnicata* (Alexander). Exterior view of an abraded left valve, x 55, unnamed Paleocene unit, Martin County, well number 1, 48-95 feet. U.S.N.M. 129763 (p. 61)
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4. *Alatacythere ivani* (Howe and Law). Right side view of an abraded specimen, x 63, Castle Hayne limestone, Craven County, well number 5, 30-40 feet. U.S.N.M. 129765 (p. 61)
5. *Protocythere paratriplicata* Swain. Right side view of a complete specimen, x 93, Black Creek formation, Pitt County, well number 2, 121-132 feet. U.S.N.M. 129831 (p. 68)
6. *Paracytheridea vandenboldi* Puri. Exterior view of a left valve, x 89, Yorktown formation, Carteret County, well number 2, 120-150 feet. U.S.N.M. 129734 (p. 59)
7. *Paracytheridca bclhavenensis* Howe and Chambers. Exterior view of a left valve, x 92, upper part of Castle Hayne limestone, Craven County, well number 3, 27-41 feet. U.S.N.M. 129735 (p. 59)
8. *Paracytheridea* (?) cf. *P.* (?) *wetherelli* (Jones). Exterior view of a left valve, x 94, Yorktown formation, well number 2, 65-80 feet. U.S.N.M. 129736 (p. 59)
9. *Cushman'dea ashermani* (Ulrich and Bassler). Exterior view of a right valve, x 62, Yorktown formation, Beaufort County, well number 6, 120-130 feet. U.S.N.M. 129822 (p. 67)
10. *Loxoconcha* cf. *L. corrugata* Alexander. Left side view of a complete specimen, x 110, unnamed Paleocene unit, Martin County, well number 1, 48-95 feet. U.S.N.M. 129815 (p. 66)
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FIGURES 2-9

Section A–A'

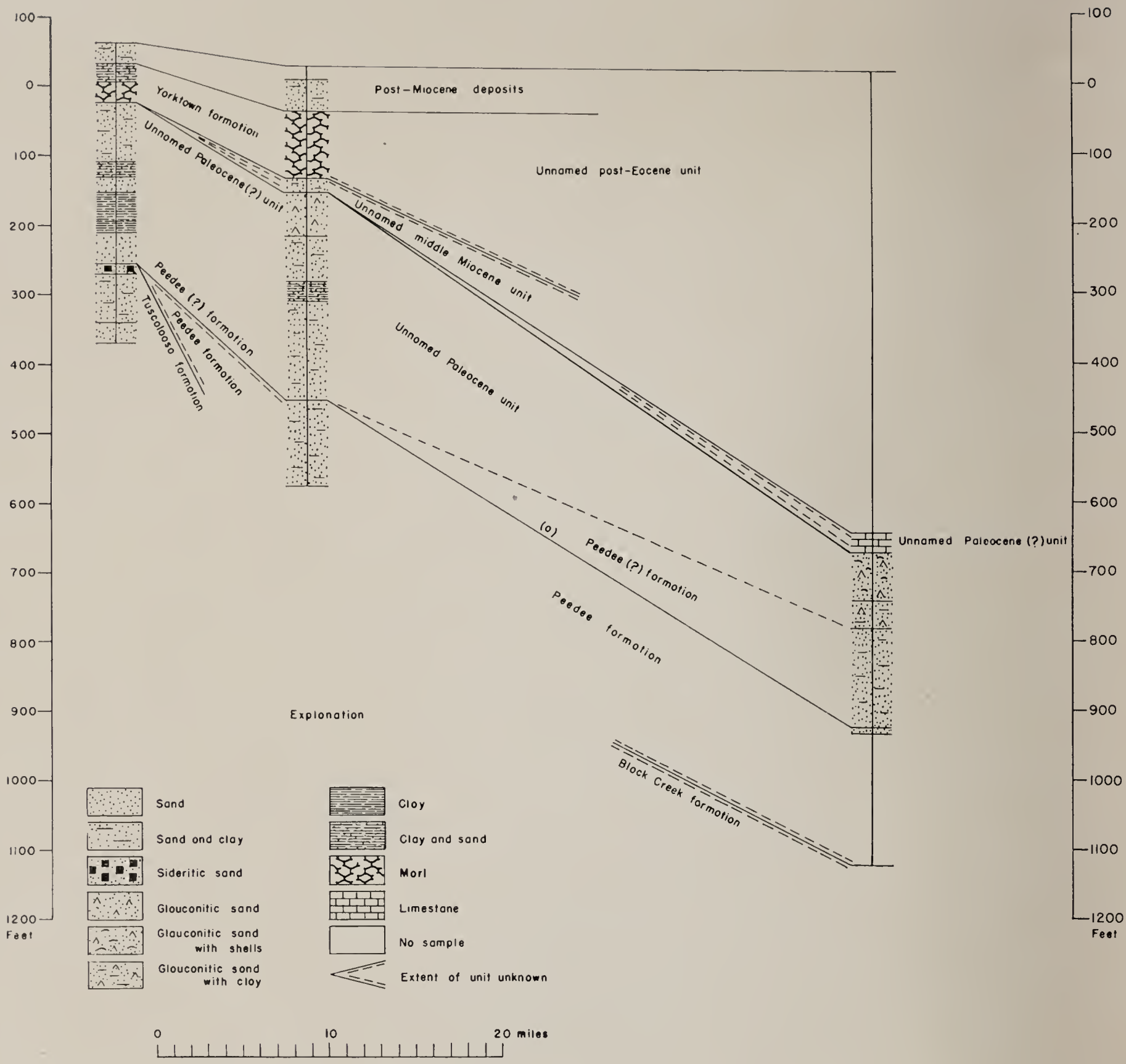
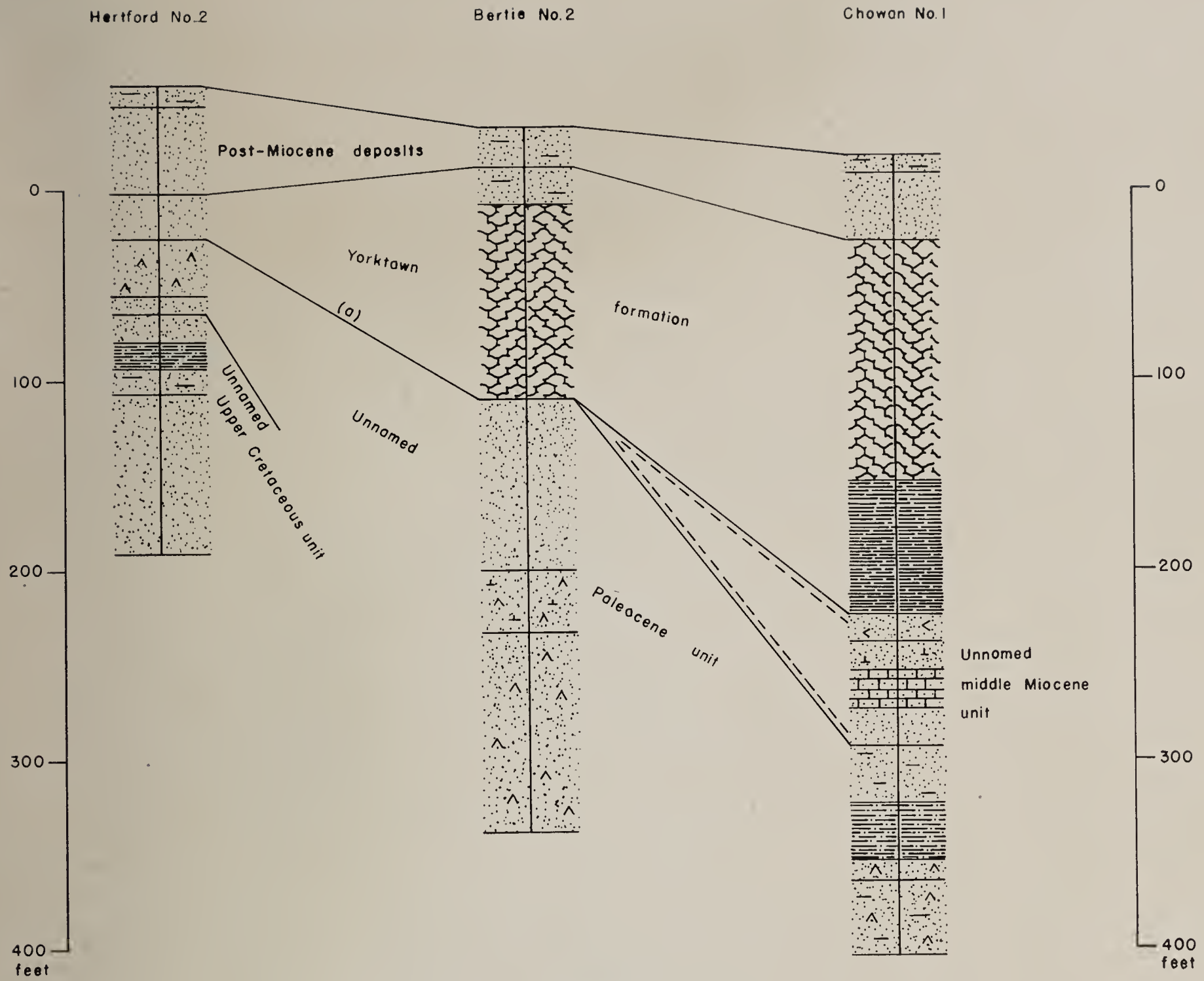


Figure 2.– Geologic cross section A–A'.
The vertical scale is greatly exaggerated for the purpose of illustrating the rock units.
The slope of line (o) is actually about 10 feet per mile.

Section B-B′



Explonotion

Sandy limestone
Sand
Sand and clay
Glauconitic sand
Phasphatic sand
Calcareous sand
Clay
Clay and sand
Marl
No somple
Extent of unit unknown

0 10 20 miles

Figure 3.- Geologic crass section B-B′
The vertical scale is greatly exaggerated for the purpose of illustrating the rock units.
The slope of line (a) is actually about 6 feet per mile

Section C-C'

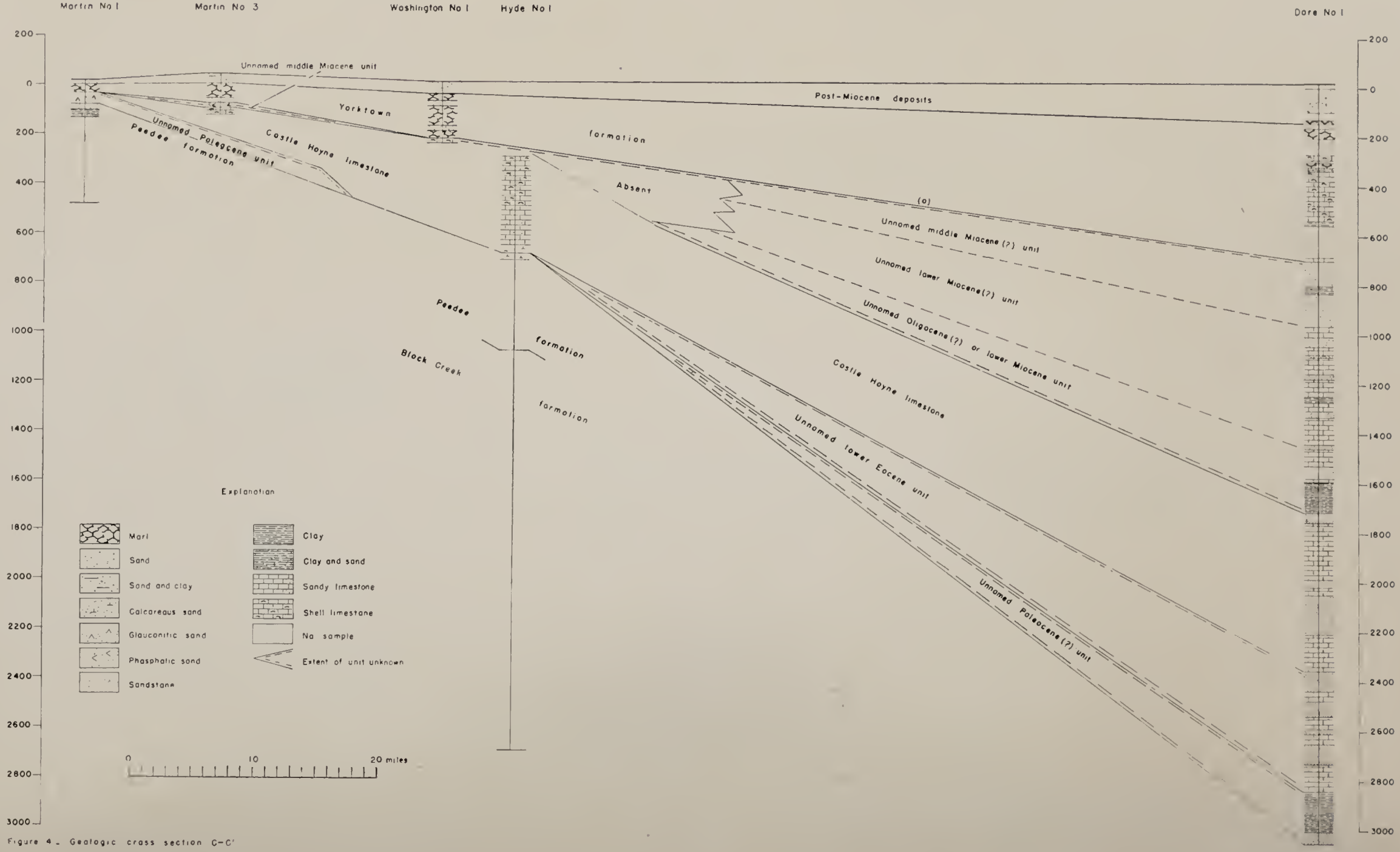


Figure 4 - Geologic cross section C-C'

The vertical scale is greatly exaggerated for the purpose of illustrating the rock units.
The slope of line (a) is actually about 6 feet per mile.

Section D-D'

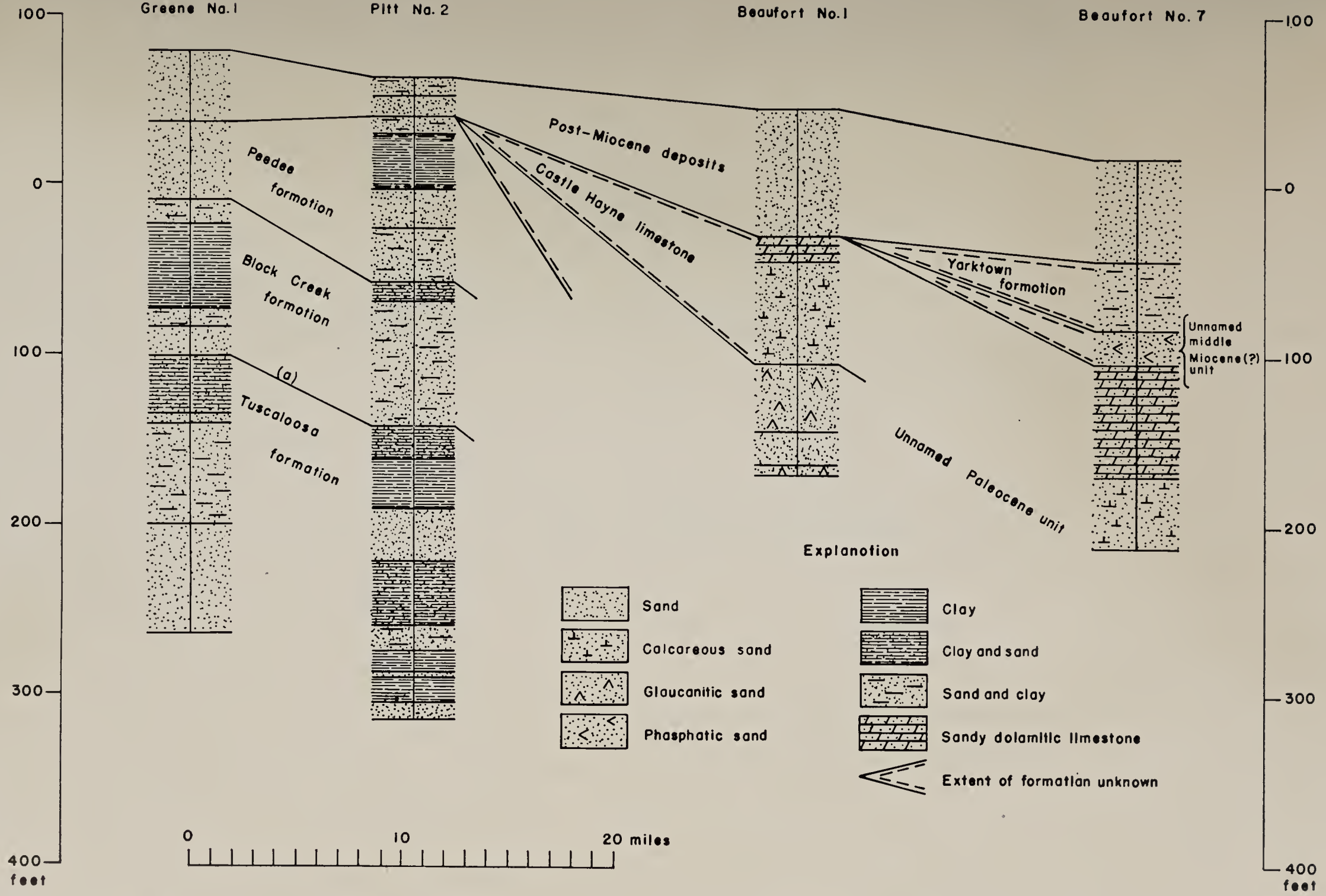


Figure 5.- Geologic cross section D-D'

The vertical scale is greatly exaggeroted for the purpose of illustroting the rock units.

The slope of line (a) is actually about 6 feet per mile.

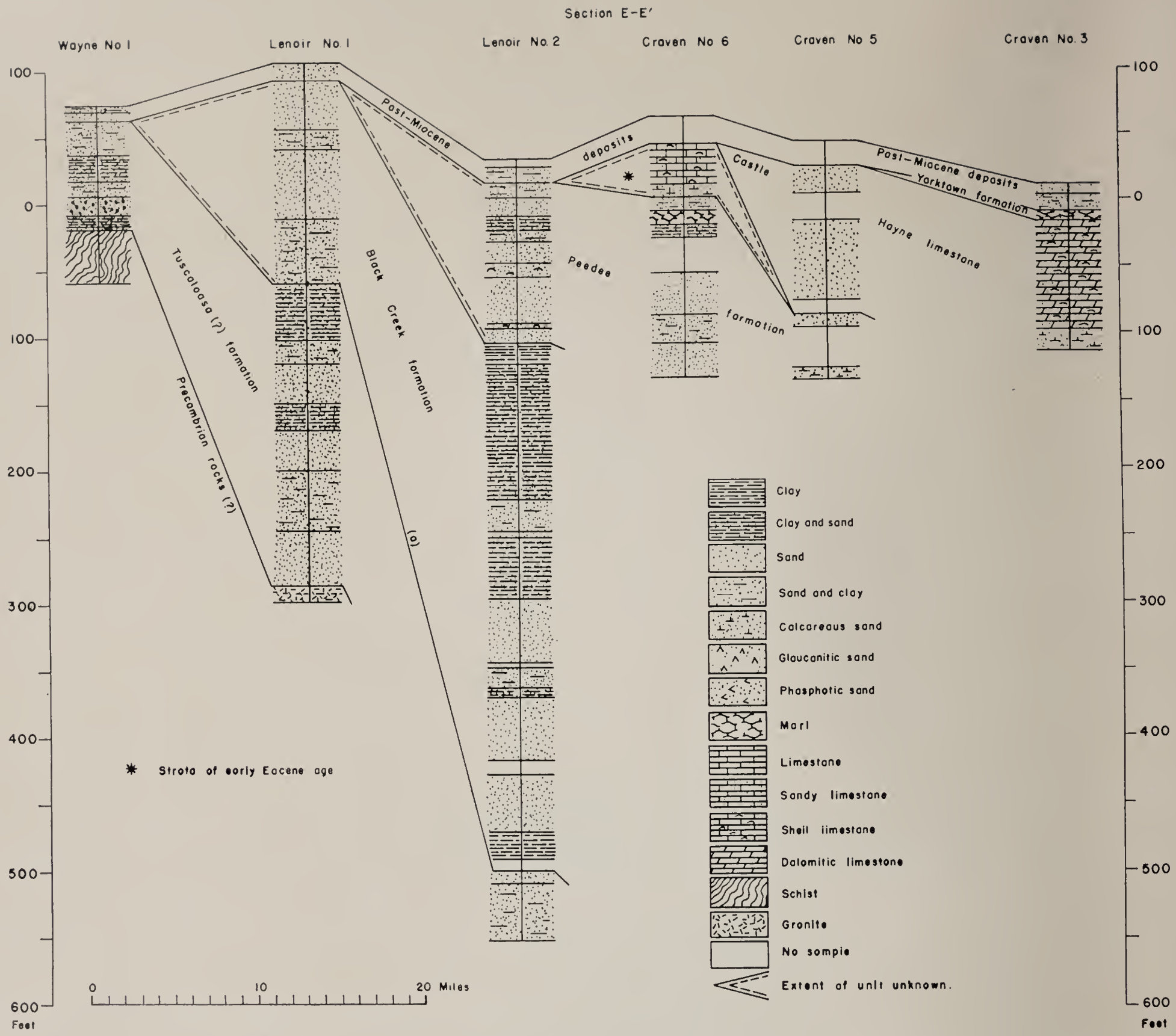


Figure 6.— Geologic cross section E–E'
The vertical scale is greatly exaggerated for the purpose of illustrating the rock units.
The slope of line (o) is actually about 32 feet per mile.

Section F-F'

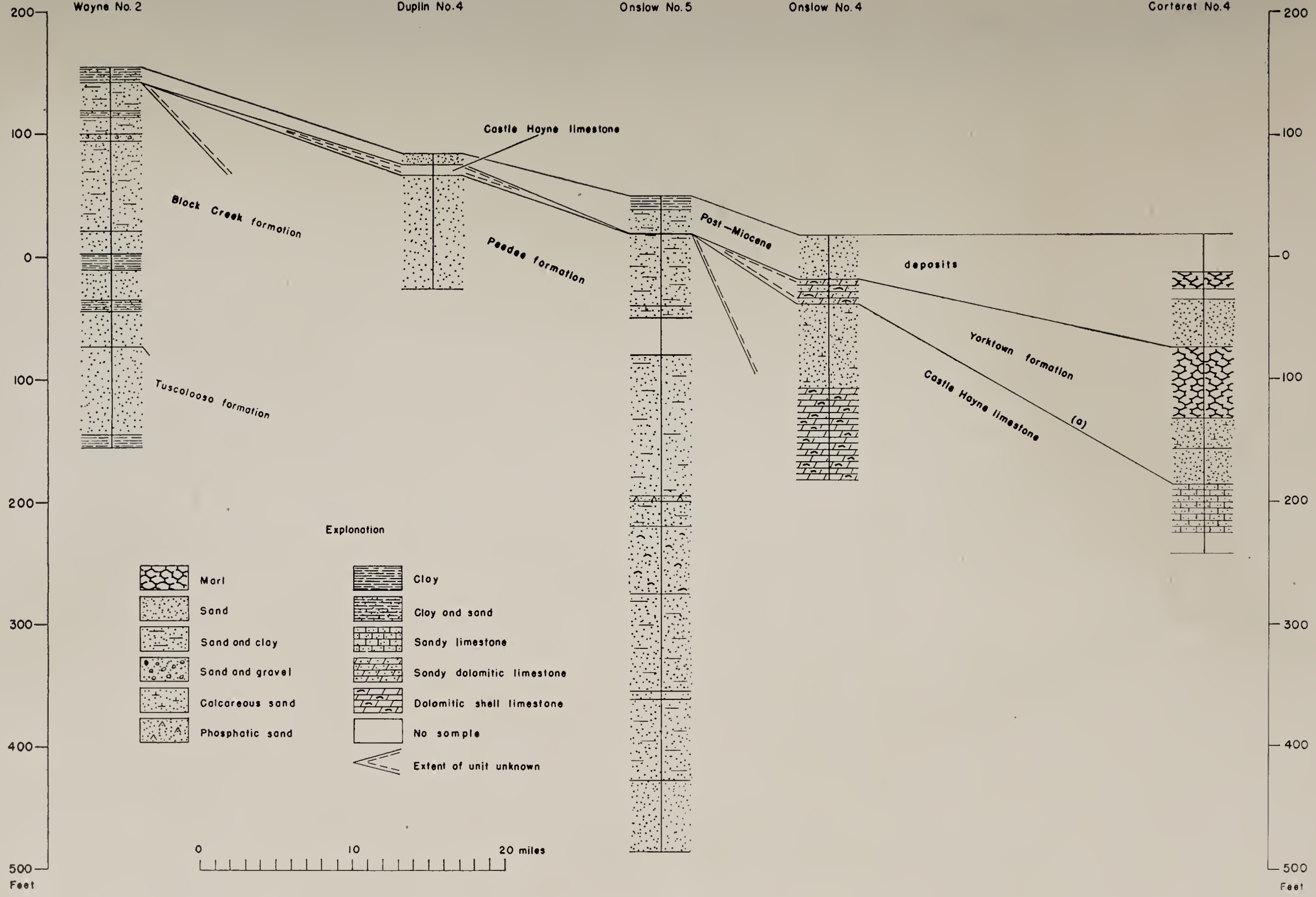


Figure 7._ Geologic cross section F-F'
The vertical scale is greatly exaggerated for the purpose of illustrating the rock units.
The slope of line (o) is actually about 6 feet per mile.

Section G-G'

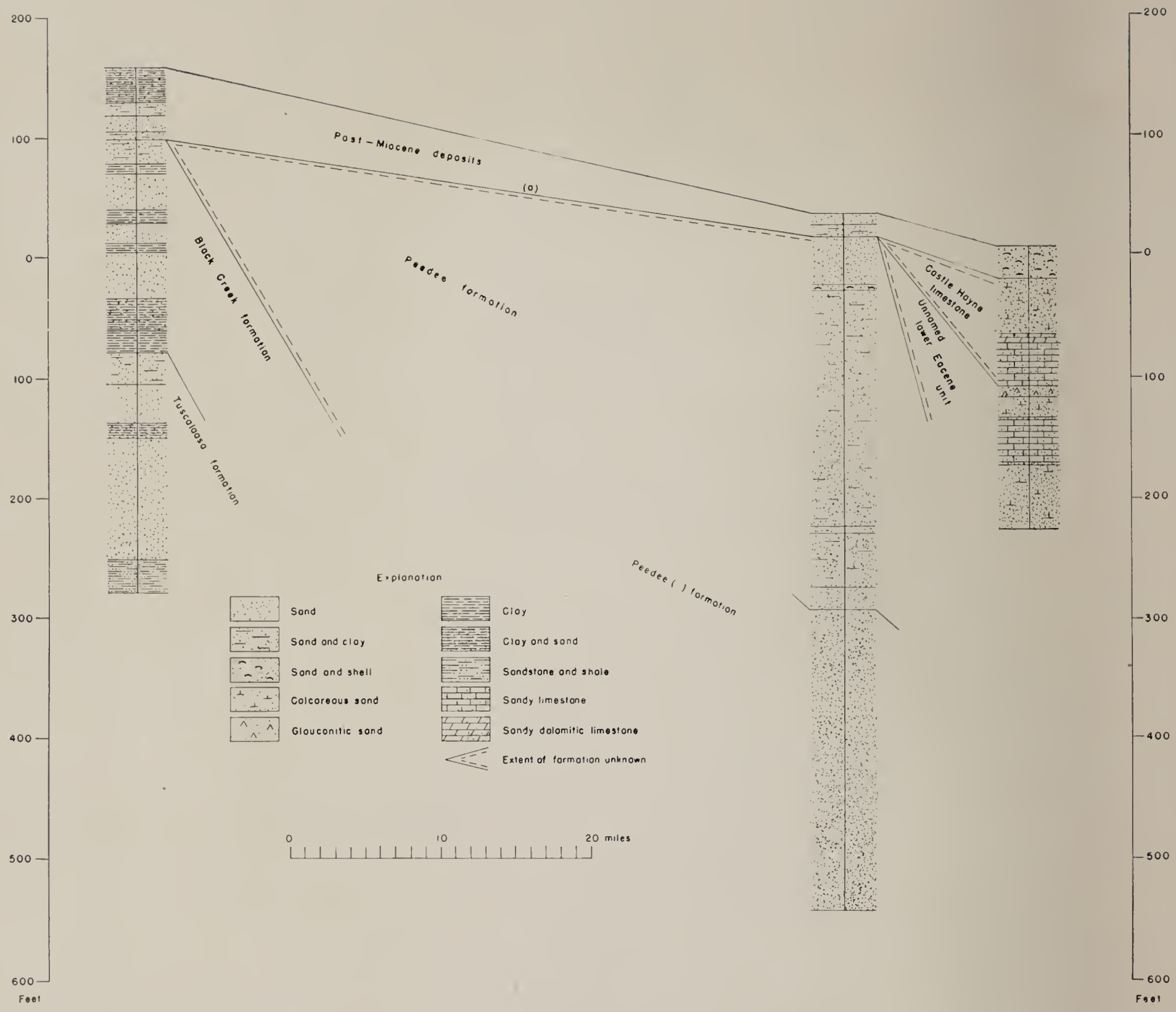
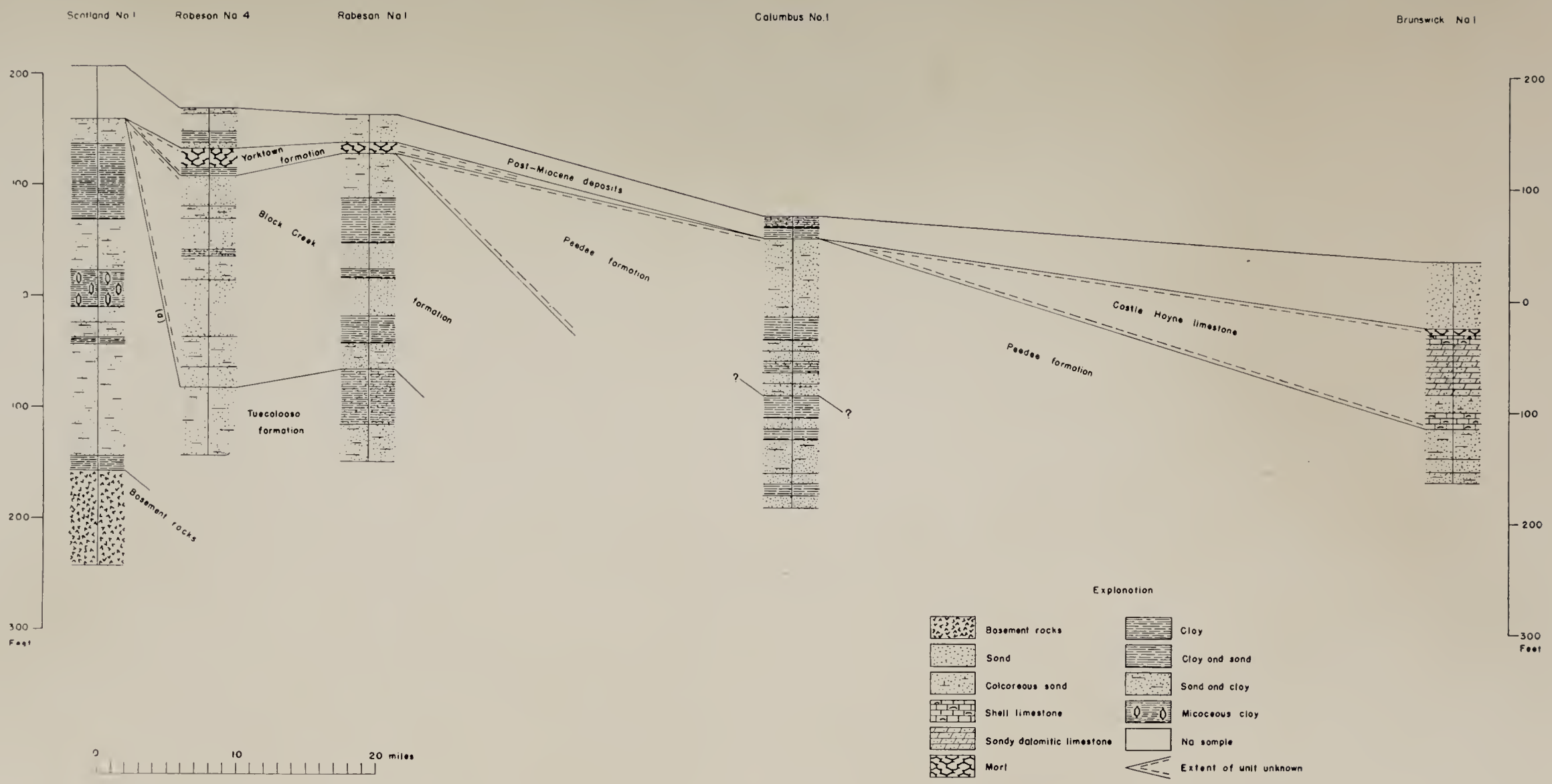


Figure 8 — Geologic cross section G-G'
The vertical scale is greatly exaggerated for the purpose of illustrating the rock units.
The slope of line (a) is actually less than 2 feet per mile

Section H-H'



Explanation

- Basement rocks
- Sand
- Calcareous sand
- Shell limestone
- Sandy dolomitic limestone
- Marl
- Clay
- Clay and sand
- Sand and clay
- Micaceous clay
- No sample
- Extent of unit unknown

Figure 9 - Geologic cross section H-H'

The vertical scale is greatly exaggerated for the purpose of illustrating the rock units.

The slope of line (a) is actually about 20 feet per mile.

TABLE

Series	Subdivision	Equivalents	Formation and members	Description	Origin	Distribution	Hydrologic properties
Pliocene, Pleistocene, and Recent			Undifferentiated deposits, include all deposits younger than late Miocene.	Light-colored fine to coarse-grained sheet and lenticular sand and interbedded clay. Sandy marl and shell beds near present coast.	Aqueous and eolian—include both marine and non-marine deposit, with no clear dividing line between the two.	Occur as a thin blanket over most of the Coastal Plain. Marine marl and shell beds confined to beaches and outer margins of the Coastal Plain.	Most common source of water for shallow well points and dug wells. Excellent water-bearing properties, though existing wells have small yields. Water contains large amounts of iron and is generally corrosive.
Miocene	Upper (?)		Duplin marl Upper ————?———— Yorktown formation (as shown in cross sections may include in its lower part equivalents of the St. Marys formation of middle Miocene age).	Light-colored sandy shell beds in upper part. Lower part consists of blue-gray marl, shell layers, and interbedded lenticular sand and massive marine clay.	Upper part, the Duplin equivalent, deposited in a littoral and sublittoral environment characterized by a fluctuating strand line. Lower part deposited, generally, in somewhat deeper water.	Widespread at surface transgressively overlapping older formations. Widespread in subsurface also, thickening in a northeasterly direction. Thickness at Edenton, N. C., recorded as 325 feet.	Water, generally hard, is obtained in small to moderate amounts from lenticular sand and shell beds. Not extensively developed as an aquifer except in extreme northeastern counties.
	dle	s of t and nk age	Unnamed, subsurface only.	Brown to chocolate phosphatic sand and sandy silt. Collophane ranges to +90 percent, averages	Deposited as a chemical precipitate and *in situ* replacement	Not known to occur in outcropping sections. Subsurface-distribution localized in Beaufort,	Not developed as an aquifer. Running sand which clogs screens is a common

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	Middle	Rocks of Calvert and Choptank age	Unnamed, subsurface only.	Brown to chocolate phosphatic sand and sandy silt. Collophane ranges to ±90 percent, averages ±30 percent. Quartz grains generally water polished.	Deposited as a chemical precipitate and *in situ* replacement in a restricted basin having limited access to the open sea.	Not known to occur in outcropping sections. Subsurface distribution localized in Beaufort, Washington, Gates, and Hyde Counties, where it is widespread.	Not developed as an aquifer. Running sand which clogs screens is a common complaint of drillers. Potential yields good. Quality of water unknown.
Eocene	Upper(?)	Rocks of Jackson (?) age	—?— C a s t l e —?—	Sandy shell limestone facies predominant. Locally, tan to cream calcareous sand and marl; secondary recrystallization common. Ranges from soft and mealy to very hard.	Marine—littoral to neritic reef deposition; open water.	Widespread surface extent south of Neuse River. Not adequately delimited, at present, from Claiborne components of the Castle Hayne. Subsurface distribution widespread south of Washington County.	High permeability, large potential yields for industrial and municipal use. Water generally hard and may contain objectionable quantities of iron.
	Middle	Rocks of Claiborne age	H a y n e lime-stone	Light-colored calcareous sand and marl facies predominant. Sandy shell limestones and dolomitic limestones occur locally. Glauconite and phosphate generally less than ±5 percent. Hardness variable.	Marine—shallow, open-water deposition. Remains of sedentary marine organisms predominate locally.	Questionably present in outcrop, not properly delimited at present time from Jackson components of the Castle Hayne. Subsurface distribution widespread in central Coastal Plain.	
	Lower	Rocks of Wilcox age	Unnamed, subsurface only.	Variable lithologically. Tan to gray fine-grained argillaceous sands; glauconite variable up to ±10 percent. Sandy limestone and dolomitic limestone facies, locally showing secondary recrystallization.	Shallow open-water deposition. Altered by wave action and secondary cementation.	Not known to occur in outcropping sections. Sporadic subsurface occurrence and variable thickness suggests an extensive period of erosion after deposition. Greatest concentration in Craven, Jones, and Onslow Counties.	Locally, high permeability of limestones and dolomitic limestones indicates large potential supplies. Water may be hard; otherwise of good quality.
Paleocene		Rocks of Midway age	Unnamed, subsurface only.	Variable in composition. Glauconitic greensands in northeastern counties: glauconite exceeds ±80 percent in some samples, averages ±60 percent. In Beaufort County tan, argillaceous fine-grained sands; glauconite ±15 percent.	Marine deposition in partially restricted basin or basins.	Not known to occur in outcropping sections. Subsurface distribution restricted; most extensive in Gates, Martin, and Hertford Counties. Not known to occur south and west of Pitt County.	Not extensively developed as an aquifer. Large to moderate potential supplies available in northeastern counties. Water generally very soft but may contain objectionable amounts of fluoride.
Cretaceous	Upper	Rocks of Navarro age	Peedee formation.	Coarse-grained glauconitic sand in upper part. Gray to green argillaceous sand, impure lenticular limestone and indurated shell beds. Locally, drab-black massive marine clays bearing close resemblance to clays of the Black Creek formation.	Marine—shallow, shelf-type deposition in northeastern and central Coastal Plain; deeper water deposition indicated in southeastern Coastal Plain. Deltaic deposits correlated with the Peedee are recognized in Hertford and Bertie Counties.	Exposed along major streams from Pitt County southward to the South Carolina line. Greatest width of outcrop about 37 miles in the Cape Fear River region. Subsurface distribution widespread, from Hertford County in the north to the South Carolina line. Thickens from a beveled edge in Pitt County to a recorded 720 feet in a well in New Hanover County.	Permeability generally variable, high to medium. Water moderately hard in southern and central sections of Coastal Plain. Soft sodium bicarbonate water in northeastern sections. Iron generally negligible.
		Rocks of Austin and Taylor age	Black Creek formation: Snow Hill marl member ?	Black to gray interbedded clay and marl. Locally, indurated impure limestone.	Shallow marine deposition.	Not adequately delimited from the lower Black Creek at the present.	Water may be hard and contain objectionable quantities of iron but otherwise acceptable.
			Black Creek formation: Unnamed member	Gray to black micaceous sand and clay, thinly bedded to massive, variable amounts of marcasite, lignite, and plant remains; sparsely glauconitic. Cross bedding prominent: sand and clay predominantly lenticular.	Near-shore marine and continental deposition. Origin is masked by transgressive and regressive fluctuations of sea level; littoral, sublittoral, and paludal deposition.	Exposed along major streams from Pitt County south to Robeson County. Subsurface distribution widespread throughout the Coastal Plain. Thickens from a featheredge along inner margin to a recorded 400 feet in a well in New Hanover County.	Lenticular sands generally have a high permeability; large to moderate supplies available, depending upon location. Locally, at shallow depths, iron may be present and the water may be corrosive. Water otherwise of good quality.
		Rocks of Woodbine and Eagle Ford age	Tuscaloosa (?) formation	Tan, red, and gray arkosic sand and interbedded clay; laminated to massive. Lenticular sand and gravel common. Cross-bedding prominent.	Chiefly deposited in a near-shore marine environment. Some sections, showing a marked continental aspect, reflect deposition along inner margins of bays and estuaries. Coarsely graded fossil stream deposits recognizable in outcrop and shallow subsurface sections.	The basal outcropping Coastal Plain formation; exposed in a belt of varying width along the eastern edge of the "fall line" from Halifax County south to Richmond County. Subsurface distribution widespread. Thickens progressively coastward; true thickness known only where wells penetrate to underlying basement rocks.	Water may contain iron; commonly corrosive in shallow subsurface. Downdip, water is generally soft and non corrosive. Yields generally high from interbedded sand and gravel. Large potential supplies available.

No sediments of early Miocene or Oligocene age were recognized below the middle Miocene phosphatic sands and above the upper Eocene Castle Hayne limestone.

Table 1.—Correlation Chart

UNIVERSITY OF ILLINOIS-URBANA
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BULLETIN. RALEIGH
72 1958
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